

JPRS 73873

20 July 1979

USSR Report

BIOMEDICAL AND BEHAVIORAL SCIENCES

No. 110

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REPORT DOCUMENTATION PAGE		1. REPORT NO. JPRS 75873		2.		3. Recipient's Accession No.																	
4. Title and Subtitle USSR REPORT: BIOMEDICAL AND BEHAVIORAL SCIENCES, No. 110						5. Report Date 20 July 1979																	
7. Author(s)						6.																	
9. Performing Organization Name and Address Joint Publications Research Service 1000 North Glebe Road Arlington, Virginia 22201						8. Performing Organization Rept. No.																	
12. Sponsoring Organization Name and Address As above						10. Project/Task/Work Unit No.																	
						11. Contract(C) or Grant(G) No. (C) (G)																	
						13. Type of Report & Period Covered																	
						14.																	
15. Supplementary Notes																							
16. Abstract (Limit: 200 words) This serial report contains articles, abstracts and news items on aerospace medicine, agrotechnology, bionics and bioacoustics, biochemistry, biophysics, environmental and ecological problems, food technology, microbiology, epidemiology and immunology, marine biology, military medicine, physiology, public health, toxicology, radiobiology, veterinary medicine, behavioral science, human engineering, psychology, psychiatry and related fields, and scientists and scientific organizations in biomedical fields.																							
17. Document Analysis a. Descriptors <table border="0"> <tr> <td>USSR</td> <td>Medicine</td> </tr> <tr> <td>Aerospace Medicine</td> <td>Microbiology</td> </tr> <tr> <td>Agrotechnology</td> <td>Physiology</td> </tr> <tr> <td>Biology</td> <td>Psychology/Psychiatry</td> </tr> <tr> <td>Botany</td> <td>Public Health</td> </tr> <tr> <td>Epidemiology/Immunology</td> <td>Radiobiology</td> </tr> <tr> <td>Human Engineering</td> <td>Toxicology</td> </tr> <tr> <td>Marine Biology</td> <td>Veterinary Medicine</td> </tr> </table>								USSR	Medicine	Aerospace Medicine	Microbiology	Agrotechnology	Physiology	Biology	Psychology/Psychiatry	Botany	Public Health	Epidemiology/Immunology	Radiobiology	Human Engineering	Toxicology	Marine Biology	Veterinary Medicine
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Human Engineering	Toxicology																						
Marine Biology	Veterinary Medicine																						
b. Identifiers/Open-Ended Terms																							
c. COSATI Field/Group 2, 5E, 5J, 6, 8A																							
18. Availability Statement Unlimited Availability Sold by NTIS Springfield, Virginia 22161						19. Security Class (This Report) UNCLASSIFIED		21. No. of Pages 187															
						20. Security Class (This Page) UNCLASSIFIED		22. Price															

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USSR REPORT
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No. 110

This serial publication contains articles, abstracts of articles and news items from USSR scientific and technical journals on the specific subjects reflected in the table of contents.

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AGROCHEMICAL SUPPORT FOR PRIVATE PLOT CULTIVATION DISCUSSED

Moscow IZVESTIYA in Russian 11 May 79 p 3

[Interview with A. V. Postnikov, Head of the Main Chemicalization Administration of the Ministry of Agriculture of the RSFSR: "An Agrochemist Will Give Advice: An Interview at a Reader's Request"]

[Text] We are occupied with orchard-growing and gardening here. Some people have the impression that every kolkhoznik, sovkhos worker and employee can be his own agronomist. But this is not the case. Almost all private plot owners require agrochemical services. We know, for example, that acid soil should be limed. But who among us knows what kind of soil he has in his orchard--acid or "fresh"? It requires agrochemical analysis. Agrochemical laboratories provide no services for private plot owners, and even at that they are not always available. What are we to do?

Here is another example: pests have appeared in orchards or gardens. What kind of pests are they and which insecticides to use?--there is nobody to ask; you don't call the kolkhoz or sovkhos agronomist to your own garden--he doesn't have any time, and besides he's up to his ears in his own work.

And now tell me this: do many people know the proper way to apply mineral fertilizers? The case here appears all the stranger if it is compared with the animal husbandry sector of the subsidiary farm economy. There are available here a sufficient number of veterinary personnel to provide livestock animal care. A veterinary worker, a veterinarian or feldsher, will always come at the first call to provide

assistance in the case of sickness in an animal or if there are questions concerning livestock care.

But why do we forget that an orchard, a garden or a potato field require the same attention and skillful maintenance?

M. Baykov.

An IZVESTIYA correspondent showed M. Baykov's letter to A. Postnikov, head of the Main Chemicalization Administration of the Ministry of Agriculture of the RSFSR.

"It is a burning question that this reader of your newspaper is raising," Anatoliy Vasil'yevich declared. "Because in the Russian Federation alone, more than 15,200,000 families cultivate private plots, while almost 2,500,000 persons belong to orchard-growing associations. At their disposal are more than 3 million hectares of agricultural land, an area equal in size to the territory of a country like Belgium.

"And society, of course, is far from remaining indifferent to how this land is utilized. The new Constitution of the USSR, incidentally, states that citizens are under the obligation to make efficient use of the plots of land with which they have been provided. I emphasize the term "efficient." And what does this mean? It means that they need to familiarize themselves with what high standards of farming entail, make skillful use of advances in agronomical science and of advanced experience and continuously increase the yields of the crops they cultivate.

"Our government offers its citizens every opportunity to conduct their private farming operations on such a basis. Evidence of this is the well-known party and government decrees, as well as the attention devoted to utilization practices in the subsidiary farming economy at the July and November (1978) plenums of the CC CPSU.

"A scientifically sound application of organic and mineral fertilizers and other chemicals plays a great, if not to say a leading, role in today's highly intensive agriculture. Kolkhozes and sovkhozes apply lime and phosphate fertilizers to their cropland and fertilize their crops in strict accordance with the agrochemical properties of the soil and the requirements of the crops under cultivation. The 115 planning and surveying chemization stations and laboratories of the State Agrochemical Service, which are to be found in every oblast, kray and autonomous republic, provide them with appropriate recommendations and agrochemical maps based on mass-scale reconnaissance and analysis of the

soils within the Russian Federation. In addition, these organizations maintain regional agrochemical agronomists as permanent representatives within each administrative region attached to and working in conjunction with rayispolkom agricultural production administrations.

A republic agrochemical testing laboratory and a Central Agricultural Agrochemical Services Institute have been set up to provide systematic direction to the agrochemical service.

All agrochemical laboratories and chemicalization stations have been provided with the latest instruments and equipment necessary, which allow them to analyze soils and plants with sufficient accuracy concurrently with farm operations under way.

[QUESTION] Do you mean to say, Anatoliy Vasil'yevich, that the republic's agrochemical service is capable and strong enough, and mobile enough, to provide its services to not only kolkhozes and sovkhoses, but to private plot owners as well?

[ANSWER] Yes. The agrochemical service is prepared in practice to take on the responsibility of handling requests from the public. More than that, we consider this to be one of its important tasks. Upon request from Tsentrosoyuz and the Ministry of Trade of the USSR, the Union Ministry of the Chemical Industry must now produce mineral fertilizers in bagged form in quantities sufficient to meet the requirements of private garden and orchard plots. But if people don't know their soil--in which nutrients it is deficient, those which it has to excess, what its acidity is--they run the risk not only of not obtaining high yields, but also of doing harm to the soil. And in addition to that, the produce may prove to be of poor quality. People only say that the carrots are always sweeter from their own patch. The contrary may be the case. And precisely because of an improper application of fertilizers.

[QUESTION] What kind of system of services for the public do you see?

[ANSWER] We can now already say to private farming-, orchard- and garden-plot owners that at their nearest chemicalization station or agrochemical laboratory they can get an analysis of soil samples they bring in for their humus content and available forms of phosphorous and potassium and a determination of their soils' acidity. Personnel there will provide them with specific advice concerning the times, methods and doses to be followed in the application of fertilizers. In the fall, which is the best time of all to take soil samples for analysis, you can obtain the assistance of the agrochemical service through the administration of your orchard-growers' association or the agronomist of the farm on which your plot is located.

The procedure employed in taking soil samples is not complicated nor does it require special equipment. It can be performed by every plot owner.

Samples are taken from garden and orchard plots separately. In the first instance they are taken to the depth of the cultivated layer, in the second from the 0-20- and 20-40-centimeter layers. The weight of a single sample should not exceed 500 grams. The soil must be placed in a small box or sack with a label indicating the location of the plot, the use to which it is being put, the depth from which the sample was taken, the date the sample was taken and the last name of the plot's owner. The results of the analysis and recommendations concerning the use of fertilizers will be ready by the beginning of spring operations. The boards of the orchard-growing associations should see to the organization of the soil sampling and the shipment of the samples to the laboratory.

All the work involved in analyzing the soils and developing recommendations concerning the use of fertilizers is performed on the basis of an economic agreement. Depending on the set of indexes, the cost of analyzing a soil sample ranges from 1 to 10 rubles.

[QUESTION] How long will it take to include all private plots and collective associations within the system of agrochemical services?

[ANSWER] If we are speaking of a complete agrochemical study and analysis of worker and employee orchard-growing associations, it will take 5 years. The same period of time has also been specified for kolkhoz and sovkhoz lands. Of course, requests from private plot owners will be fulfilled at the same time. This means that the Russian agrochemical service will have to analyze another more than 2 million soil samples each year. The Main Chemicalization Administration of the MSKh RSFSR /Ministry of Agriculture of the RSFSR/ and the republic agrochemical testing laboratory are now developing a long-term program of agrochemical services for private plots and collective orchards.

In conclusion I would like to say a few more words about my colleagues, who are also demonstrating a concern for the private orchard and garden plot. The state plant protection service has already begun consultations on measures to be taken against pests, diseases and weeds and is providing recommendations concerning the application of chemical, biological and other plant protective agents. This service has at the same time been called upon to advise all land users, including orchard-growing associations, of the forecast concerning the appearance of plant pests and diseases.

GAS CHROMATOGRAPHIC DETERMINATION OF ORGANIC COMPOUNDS IN BIOLOGICAL MEDIA

Moscow GIGIYENA I SANITARIYA in Russian No 5, 1979 pp 59-61

[Article by N.F. Sopikov, and A.I. Gorshunova, Institute of Medical-Biological Problems, USSR Ministry of Public Health, Moscow]

[Text] We propose a simple, rapid micromethod for the isolation and gas chromatographic analysis of volatile organic compounds in tissues and biological fluids. The method is based on direct thermal evaporation of the material from thin layer bioprobes in a sealed quartz tube equipped with an attachment for pyrolysis, followed by analysis of the gaseous phase.

The bioprobe to be analyzed (tissue, blood, urine) weighing 3-10 mg (optimally 4-5 mg) is spread in a thin layer (0.2-0.3 mm) on a 4X10 mm weighing paper (GOST 89270) by means of an ophtalmic scalpel, it is weighed within an accuracy of 0.05 mg and placed into a platinum boat equipped with a rod; the boat is inserted into the quartz pyrolysis tube and sealed by rotating a special stopcock. All of these steps take 20-30 sec so there is practically no chance of losing this material during the preparatory steps.

The probe is kept for 2 min at 120°C so that the material is dehydrated and the proteins are denatured without any thermal breakdown of the organic compounds; at that time the volatile organic materials pass into the gaseous phase and through a four way stopcock are directed in a stream of carrier gas into the chromatographic column equipped with flame ionization detector.

Depending on the composition of the analyzed material, the conditions for column separation are adjusted. For example, when 1,4-dioxane, 1,2-dichloroethane, isopropylbenzene and ethyl acetate are to be analyzed, satisfactory separation is achieved on a 2.6 m long celite 545 column (inside diameter 3 mm) (0.177-0.25 mm mesh) impregnated with 15% polyethylene glycol 2000. Column temperature is 75°. The flow rate of the carrier gas—helium and hydrogen is 30 ml/min. The flow rate of the air current is 300 ml/min. Detector temperature is 150°C. For the analysis of hexanol, di-2-ethylhexylsebacinate is used as the immobile phase.

The compounds analyzed register on the chromatograph as sharp, symmetric peaks. At the same time, a number of volatile organic compounds, resulting

from the endogenous metabolic process are registered on the chromatograph: acetone, acetaldehyde, ethanol, etc. Water vapor appears on the chromatograph in a broad, weak signal. Water does not interfere with the determination of analyzed compounds and does not affect the sensitivity of the detector.

Quantitative determination of the organic compounds are made from a calibration curve.

To evaluate the accuracy of this analytical method, 1,4-dioxan has been selected because it is relatively nonvolatile (135 mg/l), has a slow transformation rate in the tissue and adequate solubility in water and in biological media.

Analysis of blood and water containing an 0.2 $\mu\text{g}/10\text{ ul}$ concentration of 1,4-dioxane showed that the results differed only by 2-5%.

The accuracy of the determination of 1,4-dioxane in tissue probes was evaluated by rat liver and brain homogenates to which varying amounts of a standard solution of dioxane in water (200 $\mu\text{g}/\text{ml}$) were added. After thorough mixing of this water and the homogenates, the material was determined in the test samples containing 9.6 to 190.0 $\mu\text{g}/\text{g}$ of 1,4-dioxane. It was shown that the analytical results differed from the calculated values by only 3-5%. In special cases (with dioxan concentration at 9.6 $\mu\text{g}/\text{g}$), it was 10-12%.

When determining organic compounds in animal organs, it is necessary to use thin organ slices instead of tissue homogenates. This was verified by an experiment where thin layer bioprobes of rat liver were obtained from animals poisoned with dioxan or dichloroethane.

A thin layer of liver tissue containing the material to be analyzed was sliced off with an ophthalmic scalpel (0.2-0.3 mm), placed on a weighing paper weighed and introduced into the pyrolytic chamber in a platinum boat, to be analyzed in the above described manner. Tissue homogenates prepared from the same portion of liver were used as controls. Determination of the analytical material gave identical results from the homogenates and the liver slices. The actual results differed by not more than 10%, well within the experimental error, showing that the data from thin layer bioprobes are accurate.

Thus the proposed method for isolation and analysis of volatile organic compounds in thin layer organ slices makes it possible to shorten the preparation and analysis time for the bioprobes and consequently to lower the losses of volatile compounds. The use of milligram quantities of the tissue makes it possible to determine the content of various compounds in functionally different small organs (individual nuclei and brain centers, adrenal glands, pituitary gland, etc.) and to run a series of blood tests (dynamic tests) in small laboratory animals (rats, mice). The use of the weighing paper for the introduction of test samples into the pyrolytic attachment during the procedure prevents any direct contact between the tissue and parts of the chromatographic equipment, avoiding its contamination.

This method is universally applicable. It can be used to analyze organ tissue, biological fluids, blood and urine. Of special interest is the ability to determine in the same sample a number of volatile materials from the exogenic and endogenic sources, so that it is possible to study the effect of xenobiotics on the metabolic processes in the organism. This method has been approved for the determination of absorption, distribution and excretion of 5 different compounds with different physical-chemical properties (1,4-dioxane, isopropyl benzene, hexyl alcohol, 1,2-dichloroethane and ethyl acetate); it has completely proved itself as a simple, rapid micromethod for determination of volatile organic compounds in tissues and biologic fluids with high sensitivity. The minimum levels of the material detectable by this method are 0.01-0.02 ug per sample.

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CLINICAL MEDICINE

ON THE PATHOGENESIS OF WOUND INFECTION IN EXPERIMENTALLY CREATED WOUNDS

Tashkent MEDITSINSKIY ZHURNAL UZBEKISTANA in Russian No 1, 1979 pp 44-48

[Article by A. S. Shakirov, A. T. Sharifkhodzhayev, R. Y. Khudoyarova and R. A. Khashimova, Uzbek Scientific Research Institute of Traumatism and Orthopedics]

[Text] It is known that the entry of microbes into a wound cannot in itself be considered an infectious complication (V. M. Mel'nikov, 1975; V. I. Struchkov, A. V. Grigor'yan and V. K. Costishchev, 1975; Y. G. Shaposhnikov and E. A. Reshetnikov, 1977 and others).

Clinical and immunological changes with pus formation serve as characteristic indications of wound infection (A. A. Vishnevskiy, 1974).

Inflammation in response to external irritation is always a dynamic process. Various forms of trauma, disruption of the integument, intoxication and cold have leading importance in its pathogenesis. In addition, the species of microbe and its virulence and toxigenicity have an important role. Consequently, determination of the causes of wound infection is difficult and many-sided. Therefore, experimental study of the pathogenesis of wound infection has definite practical value.

In the literature we found only single communications on the reproduction of infected wounds in an experiment by the incision method (A. Z. Ponomareva-Astrakhantseva, 1954), cutting sections of skin and subcutaneous cellular tissue with the application of a culture (A. S. Shakirov, Z. N. Kel'man and E. Dadakhanov, 1967), infliction of a wound with subsequent infection by means of pricking (D. Shakirov, 1968) and others.

However, these methods do not reflect the extent of the development of wound infection, apparently for the following reasons. First, with the given methods we did not always succeed in reproducing the wound infection with all the clinical symptoms and suppuration. Second, these methods do not reflect the extent of tissue injury resulting from the trauma which regularly accompanies the crushing of skin, subcutaneous cellular tissue, and muscle and the possible entry of a foreign body into the injured center.

Third, the presence of microbes on the wound surface does not always cause development of a pathological process (V. I. Struchkov et al., 1975; Y. G. Shapishkov and E. A. Reshetnikov, 1977).

The goals of our studies were to reproduce the best model of an experimentally infected wound, to study the causes of suppuration, and also to observe the course of staphylococcus infection.

Fifty rabbits were used in the experiment. These were divided into 5 groups with 10 animals in each. In the first group of rabbits a 2.5 cm incision was made in the skin and subcutaneous cellular tissue of the interscapular region. The muscles were separated, and 0.2 ml of a 2 mM suspension of a daily staphylococcus aureus culture was introduced. *S. aureus* strain 209 was obtained from the L. A. Tarasevich State Scientific Research Institute of Standards and Control of Medicinal Biological Preparations.

The method of operation and culture application was the same for the other groups, except that in the second group the wound was not sutured.

In the third group 1 cm² pieces of sterile gauze were applied in addition to the staphylococcus. The gauze serves as a foreign body and creates an aerobic environment for microbes.

In the fourth group 0.3 g of sterile sand, which served as a foreign body, was introduced into the wound along with the staphylococcus culture.

In the fifth group 1.5 cm³ of muscle and subcutaneous cellular tissue were crushed with a soft clamp for 5 minutes to cause suggilation in order to create favorable conditions for microbe growth and development. The same dose of staphylococcus culture was applied to the crushed muscle (see table).

As is visible, each experimental group is a control with respect to the others.

In all groups (with the exception of the second) two sutures were applied to the incision and the wound was covered with an aseptic bandage for 24 hours.

The degree of wound infection and the course of the pathological process was rated as negative, moderately expressed, pronounced or sharply pronounced.

If the wound healed in 5 days without an increase of local and general temperature and with normal blood indices, then the result was considered an absence of wound infection, i.e. negative. The appearance of redness, infiltration, swelling and local temperature was considered a moderately expressed infection. The presence of local inflammation with the formation of pus in the wound was considered a pronounced infection. An extensive wound with the formation of an abscess 4 cm or more in diameter was considered a sharply pronounced infection.

Our daily observations showed that the intensity of wound infection depends mainly on the nature of the experimental model.

The development of wound infection in rabbits versus the experimental model

(1)Группа животных	(2)Количество животных	(3)Результат развития раны			
		отрица- тельный (4)	умеренно выражен- ный (5)	выражен- ный (6)	резко выражен- ный (7)
(8)Первая	2	2	5	3	—
(9)Вторая	2	—	4	4	—
(10)Третья	—	—	2	5	3
(11)Четвертая	—	—	—	5	5
(12)Пятая	—	—	—	—	10

Key:

- | | |
|--------------------------------|-----------------------|
| 1. Animal group | 7. Sharply pronounced |
| 2. Number of animals | 8. First |
| 3. Result of wound development | 9. Second |
| 4. Negative | 10. Third |
| 5. Moderately expressed | 11. Fourth |
| 6. Pronounced | 12. Fifth |

We were convinced that even the entry of staphylococcus into the wound does not always lead to the development of wound infection. As is visible in the data presented, wound infection did not develop in 2 rabbits of the first group. A similar observation was made for the second group.

A moderately expressed inflammatory process was established in 5 of the 10 rabbits in the first group and in 4 of the 10 in the second group. It is very interesting that sharply pronounced wound infection did not develop in the first or second group.

In the third group, where staphylococcus was introduced into the wound together with gauze, infection developed in all cases to varying degrees. In 2 rabbits it was characterized as moderately expressed, in 5 as pronounced and in 3 as sharply pronounced.

In the fourth group 5 out of the 10 rabbits developed a pronounced wound infection and 5 developed a sharply pronounced infection. The clinical course of wound infection proceeded unusually in the fourth group. It was characterized by the formation of 2-4 or more circular indurations of 1-2 cm diameter, united with one another.

Sharply pronounced wound infection with the formation of fistulae and the discharge of thick pus developed in all rabbits of the fifth group, i.e. in 100 percent of the cases where subcutaneous cellular tissue and muscles crushed with a clamp were charged with staphylococcus.

The clinical blood picture was found to depend directly on the degree of wound infection. Leukocytosis, an increased number of neutrophils in the immature and stabnuclear forms with a decrease in the percent of monocytes and

eosinophils, was less distinct in the first and second groups in comparison to the rest. More distinct changes in the blood with a significant increases in the erythrocyte sedimentation rate took place in the fifth group of rabbits.

Cultures were made weekly for microbial flora. In all cases inoculation from the inflamed center produced a pure culture of staphylococcus strain 209. The discharge of microbes from the wounds on the fifth and sixth days preceded healing.

Blood for sterility tests was taken twice from the heart, depending on the clinical condition of the experimental animals. Negative results were obtained with the exception of 2 cases in the fifth group, in which staphylococcus was isolated from their blood on the 30th and 37th days after infection. These animals died on the 45th day of observation.

A cytogram of the wound center showed the presence of a great number of leukocytes and staphylococci, both phagocytized and unphagocytized. In addition the number of free microorganisms was significantly greater in the presence of suppuration. As the wound healed, the number of microorganisms was significantly reduced. In the period of wound healing, polyblasts and monoblasts appeared.

A study of the rate of complete phagocytosis using the method of Z. K. Matusis and S. I. Pylyayeviy (1972) showed that the rate at which the number of colonies decreased in relation to the duration of incubation was identical in all groups (500 colonies in 3 hours).

Growth of the rate of complete phagocytosis was observed in the second week after the infected wound was created, and at the end of a month the index of the completeness of phagocytosis significantly increased, as expressed by a decrease in the number of colonies per dish.

After one month the number of colonies for the first and second groups was about 400, in the third group it was about 300, and in the fourth and fifth groups it was about 250. Subsequently, a slow growth of complete phagocytosis was observed in the fifth group; in 2 months there were 100 colonies, which corresponded to a reduction and resolution of the wound center.

Prior to creation of the infected wound the titer of alpha-antitoxin in the blood serum of the experimental animals varied from 0-1 units. During the development of wound infection the titer of alpha-antitoxin was in the range of 2 units. At the end of a month in animals of the first and second groups it remained the former (2 units), in the third and fourth groups it was in the range of 4 units, in the fifth group it was 5 units and after 2 months it was 7 units. Consequently, the clearest increase of leukocyte phagocytotic activity and alpha-antitoxin titer occurred in the fifth group.

The duration of wound healing varied significantly with respect to the nature of the experimental model. In the first group the average duration of healing was 20 days, in the second it was 22 days, in the third it was 31 days and in

the fourth it was 37 days. The wounds of the fifth group of animals healed considerably. Two rabbits of this group died on the 45th day of observation. Autopsy revealed suppurative foci in the liver, spleen and mesenteric lymph nodes. When cultures were made, pure staphylococcus cultures developed.

The general condition of the 8 remaining rabbits improved by the 60th day, as indicated by a normalization of temperature and a stabilization of weight, but fistulae continued to discharge pus. So all of the rabbits were autopsied 3 months after the infected wounds were created. Blood cultures from the heart, liver, spleen and mesenteric lymph nodes were sterile. Thus, comparison of the healing of the infected wounds shows that in all cases the most distinct clinical and immunological changes accompanying formation of the suppurative focus occurred in the fifth group of animals.

Consequently, the crushing of skin, subcutaneous cellular tissue and muscles has a fundamental role in the development of wound infection.

Naturally, the number of microbes and their virulence have primary importance in the development of wound infection, since without a causative agent there is no infection process. However, as our observations indicate, even highly pathogenic strains of staphylococcus aureus such as strain 209 do not always cause wound infection. Entry of similar microbes into crushed tissue absolutely guarantees the development of wound infection. Therefore, it follows to in every possible way avoid excessive traumatization of soft tissues during operations.

Thus, experimental studies on rabbits show that entry of staphylococcus onto a wound surface does not always cause wound infection.

Traumatization of soft tissues during an operation with the entry of microbes into the wound absolutely guarantees the development of wound infection.

The clinical blood picture--leukocytosis, an increase in the number of neutrophils in immature and pathological forms with a decrease in the percent of monocytes and eosinocytes--is found to depend directly on the degree of wound infection.

An increase in leukocyte phagocytotic activity and the rate of complete phagocytosis is observed 2 weeks after the infected wound is created, and it reaches a maximum in 25-30 days.

The increase of the alpha-antitoxin titer after one month to 5 AU points to a lag of the indicators of leukocyte phagocytotic activity.

20 July 1978

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UDC 614.448.5:615.275.8](575):061.3(47+57) "1978"

ALL UNION SYMPOSIUM ON HYGIENE AND BIOLOGICAL ASPECTS OF THE USE OF PESTICIDES IN CENTRAL ASIA AND IN KAZAKHSTAN

Moscow GIGIYENA I SANITARIYA in Russian No 5, 1979 pp 83-85

[Article by M.V. Kryzhanovskaya, Kiev]

[Text] The All-Union Symposium on the problems of hygiene and application of pesticides and biological control agents for agricultural pests under conditions existing in Central Asia and in Kazakhstan was held on 6-7 Sep 1978 in Dushanbe. Two hundred-fifty participants, coming from 8 republics, including representatives from the USSR Ministry of Public Health, USSR Agriculture Ministry, Tadzhik SSR Ministry of Public Health and Agriculture, representatives from professional scientific societies and medical institutes of the country, from the sanitation-epidemiological stations, plant protection stations, etc., attended the symposium.

Academician of the Academy of Medical Sciences of the USSR, L.I. Medved', the director of All-Union Scientific Research Institute GINTOKS and Chairman of the All-Union Commission on "Scientific Principles of Hygiene and Toxicology of Pesticides, Polymers and Plastics", gave a review of the current state and future potential of hygienic and toxicological studies of pesticides. He pointed out the need for continuous integration of experimental results in the development of the basis for the theory of the relationship of man to his environment and for the concentration of the effort on the detection of diseases with chemical etiology in their presymptomatic stages.

During the symposium 44 papers were presented on the hygiene of pesticide use, experimental pathology of chemical genesis, biological control measures for agricultural pests.

The Uzbekistan and Tadzhikistan hygienists and toxicologists carry out their studies in creative contact with biological and agricultural institutions concerned with plant protection and with special service systems of the Ministry of Agriculture, including Institutes of Farming, Horticulture and Viniculture. This collaborative effort was generated and continues to develop as a result of the necessity of solving the hygienic and biological problems of the use of pesticides under conditions prevailing in Central

Asia, and because of the importance of the protection of the environment and the health of the population in these regions.

The director of Tadzhik Scientific Research Institute of Epidemiology and Hygiene, Assistant professor I.S. Sattarov said that during the last 5 years many studies were carried out concerned with the toxicologic and hygienic evaluation, hygienic standardization and development of new methodology for tracing a number of pesticide preparations, this being one of the more important tasks of Public Health in the area of the selection of pesticides for hygienic and safe use in agriculture. The attention was centered on the studies of synergistic effects of pesticides and physical factors of the environment (high temperature, sun radiation) characteristic to the climatic conditions of Central Asia and Kazakhstan.

Considerable effort was spent on development of the regulations for the use of chemical plant protective agents (standards of the consumption, scheduling of the application, aggregate state, etc.), on the evaluation of working conditions and on development of regulations applicable to different methods of pesticide utilization, with due consideration of the climatic conditions and regionalization of the Tadzhik SSR into the zones of "pesticide contamination", etc.

The workers of this institute stressed the importance of the hygienic aspects of pesticide use in Central Asia because of the extent to which the chemical plant protective agents are used in agriculture and in cotton production; they affect directly or indirectly sanitary conditions and health in general of the rural population because of the peculiar conditions arising out of irrigation farming, out of the agrotechnical procedures and the technology of water supply for farming and human consumption, all of which favor the migration of pesticides into the environment and thus increase their content in food and feed. Results of long term studies of the contamination of food and environment by pesticides in Tadzhik SSR were taken into consideration when the regulations on protection of environment from pesticides were formulated, along with the rules for the hygienic utilization of herbicides in this republic.

A very interesting paper by Yu. A. Kuchak (M.D.) (Kiev) reported that an automated, unified control system for pesticide residues in the environment and in food product was being developed in CEPA; Their goal was to analyze the system: medium-pesticide with the consideration of a multitude of inter-related elements.

V.S. Buryy and N.A. Popovich (Kiev) related their experience in the use of herbicides in controlling the overgrowth on drainage canals. Several additional reports were given on this subject.

Theoretical aspects of hygienic regulations of pesticides with consideration for climatic characteristics of Central Asia were discussed by prof. Yu. S. Kagan (Kiev). The problem of remote effects of pesticides related to their

hygienic standardization and to development of criteria of harmfulness was addressed by R.A. Ryazanova (Moscow). In other papers the specificity of synergistic action of pesticides and physical factors of the environment has been pointed out (lower atmospheric pressure, sun radiation, etc.); hygienic evaluation of plant growth regulators has been reported along with mathematical planning of experiments and description of residual copper containing pesticides used on fruit and vegetable cultures. Harmful effects of the intensive use of pesticides on the health of the population has been pointed out.

Participants of the symposium noted that in the area of the improvement of medical care, and the protection of environment in fulfillment of the decisions reached at the July 78 Plenary Session of the CC CPSU "Further development of Agriculture in the USSR", the USSR Ministry of Public Health issued an order on the 11 Aug 78 providing a series of concrete organizational measures in the area of the hygienic use of pesticides:

--organization of the Tashkent Branch of All Union Scientific Research Institute GINTOKS in 1978, affiliated with the Uzbek Scientific Institute of Hygiene and Toxicology;

--organization of the All Union Commission on Hygiene and Toxicology of Plant Growth Regulators and Mineral Fertilizers (1978) (The principal organization is the Armenian Branch of the All-Union Scientific Research Institute GINTOKS);

--organization in 1980 of a single control system for residual pesticides in food products and in the environment based on computerized technology.

In the area of the biological aspects of pesticide use it was noted that the Institute of Zoology and Parasitology at the Tadzhik SSR Academy of Sciences in collaboration with the Plant Protection Branch of the Tadzhik Scientific Research Institute of Farming, the Scientific Research Institute of Horticulture and Viniculture and the Administration of Plant Protection at the Republican Ministry of Agriculture, developed a scientific basis and found practical solutions for an integrated system of the control of pests and diseases of cotton and other agricultural products. The proposed regulations for the use of pesticides in agriculture resulted in lowering the residual levels of toxic chemicals in food products and in environment.

At the same time it has been noted as abnormal that the Tadzhik Scientific Research Institute of Veterinary Medicine had no Laboratory of Toxicology, so that no research could be done on the effect of pesticides on animals, no effort expended on the determination of maximum permissible concentrations of toxic chemicals in feed and in food products from animal sources.

The participants of the symposium concluded that it was desirable to continue studying regional problems from the position of the integration of hygienic disciplines, forming a basis for the generalizations on the subject of the interaction of human organism with the environment.

In this document the need has been pointed out for studying the qualitative and quantitative contamination levels of the environment and food products, with attention to the specific methods of the application of pesticides, levels of their consumption and regional climatic and geographical characteristics. The stress was put on expansion of the studies of the health of population from the position of general hygienic tasks and development of the criteria for evaluation of presymptomatic pathology forms of chemical etiology.

Among the practical tasks it is necessary to prepare and verify differentiated lists of pesticides that could be recommended for the application in agriculture under conditions of hot Central Asian and Kazakhstan climate; it is necessary to regulate pesticides in irrigation water used on food cultures and selection of pesticides for application in irrigation farming.

The participants of the symposium felt assured that the efforts of the scientific and practical organizations of Central Asia and Kazakhstan will solve all the tasks connected with the hygienic use of pesticides in hot climate.

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ENVIRONMENTAL AND ECOLOGICAL PROBLEMS

ISRAEL'S RED SEA NUCLEAR WASTE DUMPING CRITICIZED

Moscow MEDITSINSKAYA GAZETA in Russian 23 Mar 79 p 4

[Article by V. Paruzin, Novosti Press Agency special correspondent, Beirut: "In the Business World, Poisoners"]

[Text] Rolling with a roar late at night along the deserted highway from Dimona toward the Red Sea came the trucks with their loads of containers. Soldiers rode in the cabs next to the drivers. In the predawn morning hours the column of vehicles arrived in Eilat. Avoiding the empty streets, it headed for the port. At one of the moorages the containers were quickly loaded onto an Israeli ship, which then immediately cast off.

Up to a certain point beforehand, nobody knew what was in the containers or where this cargo was headed; the ship in fact put in to no port. But no matter how hard the Israelis tried to keep their secret, some information began to make its way into the Middle Eastern press. Inside the containers, as it turned out, were nuclear wastes which the Israelis were trying to get rid of by dumping them onto the bottom of the Red Sea....

Radioactive waste is usually kept in lead and concrete capsules, which are "stored" in deep caves. Israel is a small, densely populated country, on whose territory are to be found no natural breaks in the earth's crust. If nuclear industrial waste were to be stored on Israeli territory without the construction of special storage facilities, the entire country would be threatened with radioactive contamination in the case of a "leak."

The Red Sea was finally chosen as a burial site. In the first place, it requires little time and a minimum of expenditure to move the waste to the Red Sea coast. In the second place, there are considerably fewer foreign "eyes" and "ears" in the Red Sea than in the Mediterranean Sea or the Atlantic or Indian Oceans. In the third place, this dumping site is far removed from the territory of Israel's allies, the U.S and the West European countries, and nearest of all to the Arab countries.

At this point it is difficult even to imagine the extent of the danger hanging over the Red Sea and the possible catastrophic consequences for littoral countries and world shipping. We know that the Red Sea region is among the zones of heightened seismic activity. Continual shifting of the earth's crust occurs on the sea bottom along with the formation of faults. These processes are accompanied by the release of great amounts of heat and active chemical compounds, which easily break down silicon and lead-zinc compounds. Conventional means of protection against radiation, lead and concrete capsules, are therefore unsuitable for use here.

First of all, the slightest "leak" of radioactive waste--and it is inevitable--will have a destructive effect on the flora and fauna of the Red Sea. Many species of plants and fish characteristically accumulate toxic substances, which then find their way into the human organism by way of the food chain, a process which leads to irreversible genetic damage. People consuming these fish or plants as food give birth to abnormal children, while they themselves suffer from a higher incidence of various types of cancer. Neither should it be forgotten that passing through the Red Sea every day are an enormous number of tankers and other ships, which will then be spreading radioactive particles throughout all the seas and oceans.

The Israeli capsules containing radioactive wastes at the bottom of the Red Sea are a delayed-action bomb which may go off at any moment and bring incalculable harm to mankind.

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EPIDEMIOLOGY

THE CLINICAL PICTURE OF INFLUENZA AND ACUTE RESPIRATORY DISEASE IN CONDITIONS OF POLYCLINIC OBSERVATION IN THE PERIOD OF OUTBREAK 1974-1975

Tashkent MEDITSINSKIY ZHURNAL UZBEKISTANA in Russian No 1, 1979 pp 69-70

[Article by M. A. Khodzhayeva, K. A. Maksudova and S. K. Khodzhayev, from the department of children's infections, Tashkent IUV]

[Text] We conducted a comparative analysis of the clinical characteristics of influenza and acute catarrhs of the upper respiratory tracts in an out-patient clinic with a record of the first days after the onset of the disease.

The study was conducted during the 1974-1975 epidemic and based at the infection reception rooms of the medical-sanatorium units of the Tashkentkabel' and Tashkent textile combine plant. Five hundred and eighteen patients with acute diseases of the upper respiratory tracts were examined. In 65.4 percent of the patients the disease was of average seriousness, 33.3 percent suffered from a light form of the disease, and 1.3 percent suffered from a severe form. The sick turned to medical help mainly on the second day after the onset of the disease. Those who came to doctors later probably had relatively light influenza symptoms.

When the courses of influenzas A₂, B and A₂+B were compared the main clinical symptoms we recorded were identical in all cases, differing only in the degree of expression. It was determined that intoxication developed more rapidly and was more pronounced for influenza. Increased temperature, a sense of chill, rheumatic pain, photophobia and epiphora, a sensation of dryness and tickling in the throat, and hyperemia and granularity in the soft palate were most characteristic.

In the case of acute catarrhs of the upper respiratory tracts, the catarrh syndrome appeared simultaneously with symptoms of intoxication.

When the clinical courses of influenza and acute catarrhs of the upper respiratory tracts in clinic patients were compared, significant deviations in the symptoms were not observed. We are inclined to explain this by the fact that both diseases take place on a background of inoculative immunity. Therefore influenza was a lighter form, while acute catarrhs of the upper respiratory tracts occurred on a sensitized background with a picture similar to influenza or repeating it.

For objective judgement of the clinical picture of influenza and catarrhs of the upper respiratory paths parallel virological, serological and immunofluorescence studies were conducted. The results of immunofluorescence were positive in 60.2 percent of those examined; in 70.5 percent the diagnosis was confirmed serologically. There was a 50.5 percent agreement of the serological and IF studies.

It was determined that in 49.4 percent of the patients the disease was caused by A₁ virus, in 26.5 percent it was caused by B virus, in 20.3 percent a serological shift to antibodies for A₂ and B was obtained in the blood serum, in 2.3 percent to parainfluenza, in 1.2 percent to adenovirus and in 0.3 percent to A₂BAG. Consequently, during the 1974-1975 epidemic the number of cases of disease due to group B virus increased.

In retrospective analysis of the data we detected diagnostic errors in 40.1 percent of the cases. These were mainly diagnoses of "acute catarrh of the upper respiratory tracts" for patients with influenza. The rate of recurrence of influenza was 16.3 percent among those examined.

28 June 1978

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THE USE OF ELECTRICALLY-INDUCED SLEEP IN RESTORATIVE TREATMENT OF SOME ONCOLOGY PATIENTS

Moscow VOPROSY KURORTOLOGII, FIZIOTERAPII I LECHEBNOY FIZICHESKOY KUL'TURY in Russian No 2, 1979 pp 19-24

[Article by V. N. Gerasimenko, V. A. Varlamov, Ye. V. Dorogova, I. G. Davydova, G. N. Shvetsova and V. T. Snytko, Oncology Science Center, USSR Academy of Medical Sciences, Moscow submitted 14 Nov 78]

[Text] Electric-sleep is generally recognized and widely employed in medicine as a means of neurotropic, non-pharmacological action on the CNS (V. M. Banshchikov, 1972; V. A. Gilyarovskiy et al.; S. R. Roytenberg et al.).

Owing to its simplicity of use and efficacy, it is used to treat functional and some organic diseases in neurology and psychiatry (A. S. Verigina; V. N. Yerokhina; V. S. Yefimus; R. P. Kondratenko; M. Z. Konovalova; Ye. M. Reversion); clinics of internal diseases for cardiovascular and somatic ailments (V. M. Andreyeva and V. N. Gerasimenko; V. M. Andreyeva and Ye. K. Sorokina; V. N. Gerasimenko; O. V. Dashkevich et al.; Ye. I. Sorokina; L. A. Studnitsyna; Ye. Ya. Khaykin); in surgery to affect the pain syndrome (O. N. Ivashchenko and O. N. Moskovets; S. M. Mkrtichan, 1975a; Ye. K. Shakhnovskaya, 1966, 1974); in ophthalmology (L. F. Belash); pediatrics (V. D. Bogdasarov; K. N. Krasnova et al.) and other fields.

Bearing in mind the breadth of indications for the use of electric sleep, we would agree with V. M. Banshchikov's suggestion (1976) that this method of electrical therapy has a normalizing effect on functional systems of the organism by restoring its homeostatic equilibrium.

Meanwhile, electric sleep has not yet been used in comprehensive restorative treatment of cancer patients. By taking a modern approach to organization of restorative therapy of cancer patients, we included electric sleep in a program of medical rehabilitation in persons who were previously subjected to radical antineoplastic therapy. According to statistical data, in the USSR more than 1,700,000 nominally healthy persons received special antineoplastic treatment five or more years ago (N. P. Napalkov et al.). But extensive surgical interventions, radiation, cytostatic and hormonal therapy in some patients induce functional

disorders in the organism. For example, surgical treatment of cervical and uterine cancer in the form of extended extirpation of the uterus and its appendages in 50 to 85 percent of the cases leads to the development of the so-called post-castration syndrome. Consequently, the problem of adequate restorative treatment of these patients becomes even more important (V. N. Gerasimenko, 1976;).

We observed 55 females with pronounced autonomous-vascular, neuropsychic and metabolic-endocrinal disorders, to whom we gave electric sleep in a plan of restorative treatment. Four patients had had uterine cancer in the past (Stage I in one woman; Stage II in three); cervical cancer in 51 women (Stage I in 34, Stage II in 17 persons). Forty women were between the ages of 30 and 50; 15 women were over 50 years of age. It had been one to five years since completion of special treatment for 19 patients; and five to 10 years for 36 patients.

Ten women were Group II and III invalids; eight women were retired (for reasons of age); and 37 were employed in their field.

All patients were given a thorough clinical examination, including EEG. No manifestations of basic illness were detected. Of concomitant ailments, one patient had initial-stage diabetes, 12 had hypertension Stages II-III, two women had pyelonephritis; 10 women had lumbosacral radiculitis; one woman had bronchial asthma; four women had chronic cystitis; and four women had chronic IHD.

The clinical picture of the post-castration syndrome was expressed in the form of autonomous vascular disorders ("hot flashes", febrile sensation, profuse perspiration, palpitation, headache, pericardiac pain, dizziness, numbing of extremities). Also typical was the presence of metabolic and endocrinal (some degree of obesity, cholesterolemia, joint and extremity pain, osteoporosis) and neuropsychic disorders. The severity of the post-castration syndrome was rated on the scale developed by I. A. Manuilova.

The frequency of "hot flashes" ranged from two to 30 days. First degree post-castration syndrome (from 2-10 "hot flashes" per day) was found in 25 women; second degree (10-20 "hot flashes" per day) in 28, third degree (20-30 "hot flashes" per day) in 2 patients.

All patients were given electric sleep along with general fortifying measures, symptomatic sedatives and analgesics.

The electric sleep procedure (ES-4 and ES-4T devices) was done according to oculo-occipital methods of induction with a minimum frequency of pulsed current of 8-16 hertz (36 patients) and maximum of 120-140 hertz (14 patients); the current frequency was selected on an individual basis according to patient sensitivity. Current intensity was 6-12 milliamps; the procedure lasted 20 to 40 minutes increasing in 5 minute steps for a course of 15-25 procedures.

The neuropsychic status of patients was monitored during the clinical observation. To evaluate the functional state of the CNS during the treatment process (after the first, fifth and complete course), bioelectric activity of the brain and cardiac rhythm were recorded; the critical flicker frequency (CPF) and its asymmetry were determined.

EEGs were recorded on an eight-channel encephalograph manufactured by the Alvar Company, with the patient reclining with eyes closed. Symmetric leads from both cerebral hemispheres were used; both bipolar (fronto-temporal, frontoparietal, parietooccipital) and monopolar frontal with dispersing electrode on the lobules of the ear.

Analysis of cardiac rhythm showed a correlation between the balance of extracardiac effects and the functional state of the patient's CNS (V. A. Varlamov, 1975).

Cardiac rhythm was recorded for one minute and 40 seconds. Some 101 R-R intervals were taken for analysis. The figure 101 was chosen to produce 100 indicators of velocity of R-R rearrangement, defined as the difference between the preceeding and following R-R intervals ($R-R_1-R-R_2$; $R-R_2-R-R_3$, etc.). An R-R distribution histogram was constructed; the power of the W variation series was computed; it is defined from the histogram as the sum of the most frequently encountered interval plus the nearest two. For quantitative characterization of the balance of sympathetic and parasympathetic effects on the heart, the balance coefficient K_b ($K_b = (-M)/(+M)$), where $-M$ is the average rate of rearrangement of R-R with a negative sign, $+M$ is with positive sign from 100 derivatives. The envelope periodogram was recorded.

The critical flicker fusion frequency was determined according to the effect of flickers separately for the left and right eye. Asymmetry was defined as the difference in CPF between the left and right eye. The absence of a correlation between asymmetry indicators and visual fields, in spite of the presence of an intersection of optical pathways, seems to be caused by a completely defined hemispherical tie-in of the visual analyzer which ensures its lability.

As a result of dynamic observation of a psychiatrist, all patients presented with asthenoneurotic disorders. In 19 women who had undergone surgical treatment of several months to 3-5 years, the asthenoneurotic neurotoid syndrome with depressive strata predominated.

In the clinical picture they presented with flaccidity, asthenia, hypochondriac "concern with disease" with constant discourses about it. In 7 patients there was a manifestation of stimulant asthenia and general hypersthenic background of perception. This was subjectively perceived as constant discomfort. Patients were uneasy, irritable, preferred solitude, felt the burden of conversations with others in the ward.

Some 5-10 years after surgery, 29 patients presented with symptoms of a "psychoorganic circle". In addition to a reduction in mental activity, memory impairment, mood shifts, autonomous nervous disorders the clinical picture was dominated by depressive and hypochondriac manifestations with senestopathies, frequent complaints of headache, pericardiac pain and increased fatiguability. Patients suffered with insomnia. In many, night sleep was superficial, did not bring rest, was accompanied by nightmares. In some instances there was suspiciousness, increased suggestibility, tendency toward affective outbursts.

As a result of the course of treatment, a clear clinical effect was achieved in 50 patients; the status of four women was unchanged; and one patient showed an intensified post-castration syndrome. Under the influence of electric sleep, "hot flashes" ceased in eight patients; became infrequent in 42 patients--up to 1-3 per day. At the end of the course of treatment, patients' blood pressure had become normal. At the same time that overall health improved there was a disappearance or diminution of paresthesia of the hands, and pains in the joints and extremities.

During treatment the first to be reduced was the severity of such asthenoneurotic phenomena as hypersthenia, irritability, hot temper. Night sleep became more profound and patients felt good upon awakening. General relaxation was noted. Treatment had a less pronounced effect on depressive symptoms; general stress in patients was, on the whole, diminished.

In analyzing EEGs, in most patients there were excesses of amplitude and percentage indices of alpha and beta activity typical of the norm and uneven alpha-rhythm amplitude frequency. Such changes as the acuminate form of fluctuations of alpha and beta rhythm, isolated and multiple sharp waves with the dimensionality of alpha and beta waves, including discharges of high-voltage acute waves were also noted; in seven patients no deviations from the norm were noted.

After the course of electric sleep treatment, signs of normalization of electrical brain potentials were detected: attenuation of frequent and/or slow activity, tendency toward greater regularity and evenness of alpha rhythm, and a reduction in the number of acuminate fluctuations of acute waves (Figure 1).

Ten patients presented with weakly-negative EEGs and four patients with negative EEG dynamics. In 12 of these 14 patients, electric sleep was conducted at frequencies of 120-140 Hz and only in two at frequencies of 8-16 Hz. According to the observations of V. M. Andreyeva there is a link between negative EEG dynamics and the use of electric sleep at frequencies above 100 Hz in non-oncologic patients with diencephalic pathology.

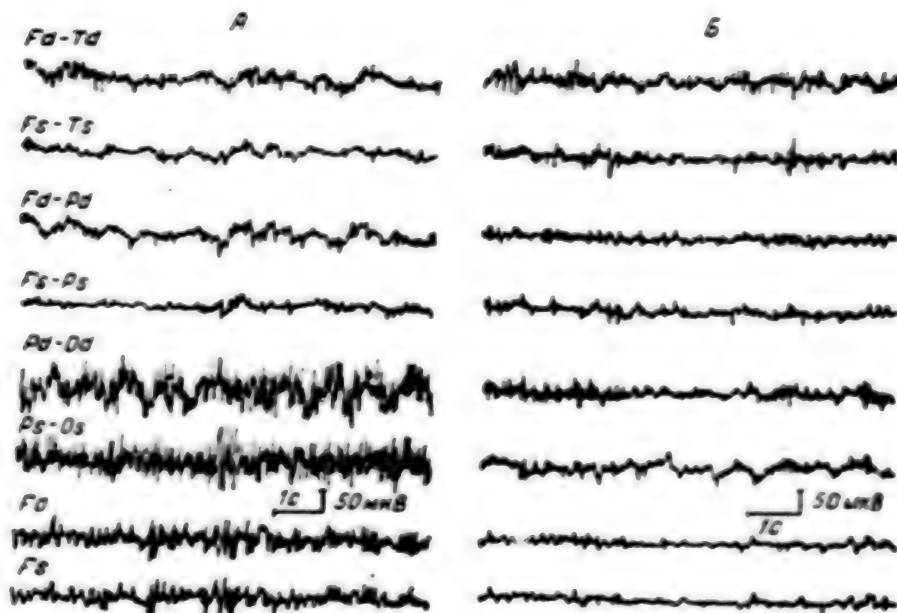


Figure 1. EEG of patient S, 51 years old. Diagnosis: state after comprehensive treatment of cervical cancer in 1967, Stage I, postcastration syndrome Step II. A: before use of electric sleep: sharp, diffuse effects of stimulation; B: after one month (after electric sleep): reduction of mean amplitude of electrical activity, reduction in number of acuminate fluctuations and acute waves. Leads: F-T (frontotemporal); F-P (frontoparietal); PO (parietooccipital); F (frontal with dispersing auricular electrode; d,s: right and left hemispheres.

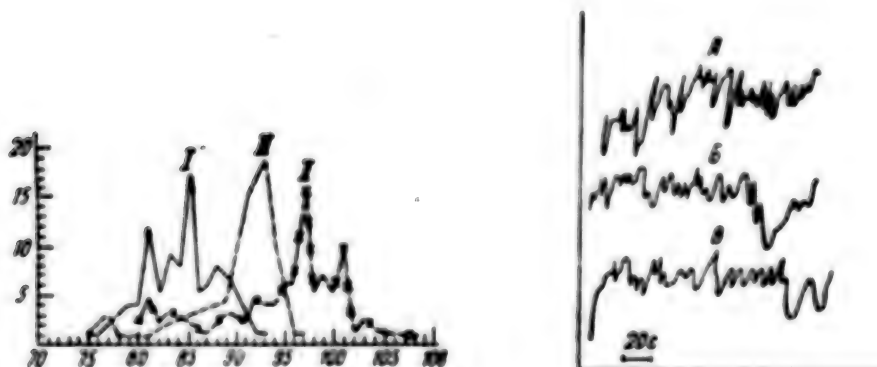


Figure 2. Dynamics of distribution of R-R intervals in same patient under influence of electric sleep treatment. I: background--multimodal (multi-peak) curve; II: after 1st procedure; III: after 5th procedure--single peak, close to normal type. Figure 3. Dynamics of slow component of cardiac rhythm of same patient under influence of electric sleep treatment: A: background--pronounced slow waves (over 20 sec), modulated by rapid waves (less than 7 sec); B: after 1st procedure; C: after 5th electric sleep: reduction of slow components of cardiac rhythm and virtual disappearance of rapid waves.

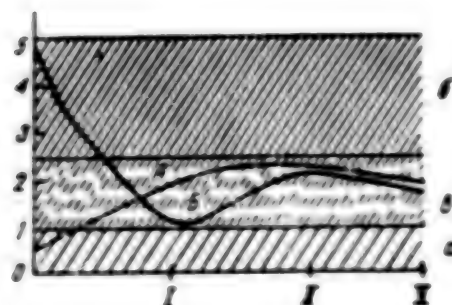


Figure 4. Dynamics of asymmetry of CFF under the influence of electric sleep treatment. A: patient in state of depression; B: patient in state of excitation. I, II, V: procedure number; a: depression; b: increased excitability; c: optimum state; 1-5: CFF data.

Analysis of cardiac rhythm showed that electric sleep had significantly improved extracardiac regulation. After the patient entered the hospital the distribution of R/R rhythm showed a multimodal (multipeak) curve (Figure 2, background). After the fifth procedure the distribution usually took a form similar to normal. This proves that the higher centers of cardiac rhythm regulation had begun to operate more harmoniously. The output of the W variation series increased significantly. In analysis of the cited case (Figure 3) the output of intervals of distribution of R/k before treatment was 45; after treatment--up to 55. Improvement of operation of the higher sections of the CNS was recorded by data of the slow component of the periodogram of R/R. While before treatment (cf. Figure 3A, background) there were pronounced slowwaves with a period of over 20 sec, modulated by comparatively rapid waves with a period of less than 7 sec, after the fifth procedure there was a considerable drop in the period of slow components of rhythm, reaching 8-15 sec, and an almost total disappearance of rhythms less than 7 sec (cf. Figure 3B,C). This indicates an intensification of the activating effect of the functional state of the CNS (V. A. Varlamov, 1975). The coefficient of balance of sympathetic-parasympathetic effects on the heart in analyzing the background data was 1.04 (with a norm of 1.1); after electric sleep --1.28. A rise in the coefficient of balance was due to the more powerful extracardiac effect of parasympathetic sections of the CNS which, in this case, is optimum.

Under the influence of electric sleep there was an increase in lability of the CNS (Figure 4), which was proven by an increase in the CFF, improvement of psychological status of patients and, if the initial state was depression or increased excitation, then after 1-5 procedures of electric sleep there occurred a general normalization of physiological processes.

Our observations thus confirmed the possibility of using electric sleep for restorative treatment of oncologic patients. Electric sleep procedures should be done at low frequencies.

The data cited here are our first attempt to use electrotherapy in treated cancer patients. Before prescribing electric sleep it was necessary to conduct a controlled clinical observation of patients using EEG to eliminate manifestations of the primary disease.

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RESULTS OF AFFILIATED STUDIES OF THE EFFECTIVENESS OF THE COMBINED
CHEMOTHERAPIES METHYL-CCNU + 5-FLUOROURACIL AND METHYL-CCNU + FLUORAFUR IN
PATIENTS WITH STOMACH CANCER

Tashkent MEDITSINSKIY ZHURNAL UZBEKISTANA in Russian No 1, 1979 pp 67-69

[Article by B. D. Abdurasulov, N. I. Perevodchikova, L. V. Moroz, M. B. Bychkov, A. A. Shayn, V. I. Borisov, A. I. Borisov, I. G. Rayevskiy, V. S. Molene, L. V. Platinskiy and N. I. Dement'yeva, from the Oncological Center, USSR Academy of Medical Sciences]

[Text] In January of 1977 the division of chemotherapy of the Oncological Center, USSR Academy of Medical Sciences organized a cooperative study of the effectiveness of the combined chemotherapies methyl-CCNU + 5-fluorouracil and methyl-CCNU + fluorafur in patients with stomach cancer. The oncological clinics of Moscow and other cities participated in the study.

A methyl-CCNU preparation of the nitrosourea class was made in the USA and delivered to the USSR in accordance with the agreement on cooperation between the USSR and USA in the field of drug therapy for malignant neoplasms. Used alone, methyl-CCNU possesses a pronounced antitumor effect for several solid tumors and hemoblasts. The most comprehensive data of a clinical study of methyl-CCNU were presented by T. H. Wasserman et al. (1974). In a phase III clinical study of methyl-CCNU it was determined that the combination of methyl-CCNU + 5-fluorouracil possesses a pronounced antitumor effect for stomach cancer and cancer of the rectum and colon (H. O. Douglass et al., 1976; C. G. Moertel et al., 1976). These researchers presented data on a 40 percent effectiveness when this combination is used on patients with stomach cancer. In later studies the effect was observed in a smaller number of patients (L. H. Baker, V. K. Vaitkevicius et al., 1976; L. H. Baker, R. W. Talley, R. Matter et al., 1976).

In September of 1974 the U. S. National Institute of Cancer organized a study of chemotherapy for stomach cancer with preparations of adriamycin and combinations of the preparations 5-fluorouracil + mitomycin-C and 5-fluorouracil + methyl-CCNU. The latter combination was proposed for study in the division of chemotherapy of the Oncological Center, USSR Academy of Medical Sciences.

All patients in the study were divided into 2 groups with 50 patients in each by a method of blind selection. Treatment was assigned after a special envelope was opened.

Patients of the first group received 150 mg/m^2 methyl-CCNU once in the first day of treatment and, as a second course of treatment, through 10 weeks (10 days) + 5-fluorouracil in a 325 mg/m^2 internal dose for five days (from the first to fifth day). Supporting treatment with 5-fluorouracil was given from the 36th to 40th day (counting from the first day of treatment) in a dose of 375 mg/m^2 . A second course of treatment with 5-fluorouracil was given on days 70-74 (counting from the first day of treatment) in the same dose as for the first course.

Patients of the second group obtained methyl-CCNU in the same regime as did the first group of patients in addition to 1 g/m^2 fluorafur internally 6 times per week for 3 weeks (days 1 to 20). Supporting treatment with fluorafur was given 2 weeks after the initial cycle ended for 2 weeks (days 36-40). A second course of treatment with methyl-CCNU + fluorafur was given through 10 weeks.

Repeated courses of chemotherapy were not prescribed when the disease progressed. Results of the treatment were estimated after x-ray and endoscopic studies of the stomach.

The effectiveness of the combined chemotherapies methyl-CCNU + fluorouracil and methyl-CCNU + fluorafur was studied in 103 patients with inoperable cancer (in stages III and IV of the tumor spreading). Of them 84 (59 men and 24 women) were subject to evaluation of the treatment.

In the group of patients which received the combined chemotherapy methyl-CCNU + fluorouracil an effect of the treatment was recorded for 4 of the 47 patients (8.5 percent). In the second group of patients, who received the combination methyl-CCNU + fluorafur, an effect of the treatment was noticed in 5 of the 37 (13.5 percent). The difference is statistically insignificant.

The average time from the beginning of the treatment to progression was 56.4 days in the first group and 66.3 in the second.

The toxic effects of the combined chemotherapy methyl-CCNU + 5-fluorouracil were mainly a delayed depression of hemopoiesis in 23 patients (48.9 percent), nausea and vomiting appearing several hours after administration of methyl-CCNU in 17 (36.2 percent) and diarrhea in 7 (14.9 percent). In the second group the same toxic symptoms were noticed: delayed depression of hemopoiesis in 24 patients (64.8 percent), nausea and vomiting in 12 (32.4 percent) and diarrhea in 4 (10.8 percent).

Conclusions

1. Analysis of the administration of methyl-CCNU + fluorouracil and methyl-CCNU + fluorafur in patients with stomach cancer indicates a low antitumor effect of the two regimes of combined chemotherapy--8.5 and 13.5 percent respectively.

2. Combinations of the preparations are highly toxic, so they must be administered carefully.

3. Application of methyl-CCNU in combination with fluorine derivative antimetabolites indicates that the first inhibits the action of the later, which by itself has an effectiveness of 20-40 percent according to the literature.

16 October 1978

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CSO: 1870

SECRETORY AND PERISTALTIC FUNCTIONS OF THE STOMACH IN WORKERS OF VARIOUS SHOPS OF THE SAMARKAND SUPERPHOSPHATE PLANT WHO SUFFER FROM CHRONIC GASTRITIS

Tashkent MEDITSINSKIY ZHURNAL UZBEKISTANA in Russian No 1, 1979 pp 64-67

[Article by Professor A. D. Dzhalalov, A. T. Arustamyan, R. N. Kitaynik, L. S. Ruzanova, N. A. Dan'shina, T. V. Belikova, A. P. Li and S. S. Tishkov, Department of Hospital Therapeutics I, Samarkand Medical Institute]

[Text] The functional condition of the stomach in workers and employees of various shops of the sulfuric acid and superphosphate industry has been insufficiently studied. Meanwhile experiments of several investigators have shown that the dust of simple and ammoniated superphosphates can enter the gastrointestinal tract and have a toxic effect on the functional state of the stomach (D. L. Schpindler, 1941; K. Stranus, 1956; N. B. Voloshinova, 1961; A. S. Arkhipov et al., 1975 and others).

We placed before ourselves the task of studying the secretory and peristaltic activity of the stomach in workers and employees of various shops of the Samarkand Superphosphate Plant. The workers studied were suspected to be suffering from chronic gastritis when given medical examinations by us in 1972-1975.

The main shops of the plant include shops for the production of sulfuric acid, simple and ammoniated superphosphates, and ammophos and for neutralization. The main professional hazards which the workers in these shops are exposed to are sulfuric and sulphurous anhydrides, dust from ashes and pyrites, selenic and arsenous anhydrides, fluoric compounds, dust of simple and pelletized superphosphates, and ammonia gas. In 1975 there was a significant reduction in the concentrations of the dust-gas mixture associated with the use of liquid sulfur in the process of sulfuric acid production. But according to data of the Samarkand State Sanitary and Epidemiological Station and the literature (I. A. Dzhakhangirov, 1970; N. S. Tadzhbayeva, 1973 and others) they still exceed the maximum permissible concentration by 5-10 times or more.

Among the 118 studied 86 (72.1 percent) were males and 32 (27.9 percent) were females. However, the 86 male patients came from a field of 1455 examined males (5.9 ± 1.9 percent) and the 32 females were among 399 examined females (8.02 ± 0.34 percent). This implies that the toxicochemical factors of

superphosphate production have a greater effect on the stomach functions of women. The patients were from 20 to 64 years of age: 28 were from 20 to 30, 37 were from 31 to 40, 35 were from 41 to 50, 14 were from 51 to 60, and 3 were from 61 to 64. Twenty (16.9 percent) of the employees had worked in the plant for up to 4 years, 30 (25.4 percent) had worked there for 4 to 8 years, 15 (12.7 percent) had worked for 8 to 12 years, and 21 (17.9 percent) had worked for 12 to 16 years. Of the 118 patients 20 (16.9 percent) worked on sulfuric acid production, 34 (28.8 percent) worked on simple superphosphate production, 30 (25.4 percent) worked on ammoniated superphosphate production, 18 (15.2 percent) worked on neutralization and ammophos production, and 16 (13.6 percent) worked in other shops.

As a control group we studied healthy women (5) and men (5) who were 25 to 31 years of age. Disorders of secretory and peristaltic stomach functions were not observed in them.

The secretory function of the stomach was studied with fractionation methods. Three hundred milliliters of a 7 percent cabbage broth with added color indicators was used as a test meal to study the evacuatory function of the stomach.

The average amount of gastric juice on an empty stomach did not exceed 10 ml in 32 patients (27.1 percent), in 62 patients (52.0 percent) it amounted to 11-30 ml, and in 24 (20.9 percent) it was 31-70 ml. After the test meal the amount of gastric juice was on the average up to 10 ml in 7 patients (5.8 percent), from 11-30 ml in 93 (79.0 percent) and from 31-70 ml in 18 (15.2 percent). The total and free acidity of the gastric juice on an empty stomach was favorable in 94 patients (79.5 percent); in 24 it was unfavorable. Data after the test meal are presented in the table.

As is visible from the table, reduction of the total and free acidity (HCl) of the gastric juice was observed more often among workers of the main shops and frequently among workers of the auxilliary shops of the plant while anacidity and hyperacidity was not observed among persons of the control group. Analysis of the data permitted the determination of chronic gastritis with increased secretion in 40 patients, normal acidity in 12, hypoacidity in 50 and anacidity in 16. In all cases anacid gastritis was diagnosed after histamine tests were conducted.

Analysis of the hourly secretion of hydrochloric acid in the gastric juice showed an asthenic (labile) type of gastric secretion in 62 patients (52.5 percent), inert secretion in 29 (25.8 percent) and isosecretory secretion in 27 (22.9 percent). Secretion in persons of the control group was labile. Lactic acid was absent in all samples of gastric juice.

A study of the evacuatory function of the stomach showed that the time required for the color indicator to disappear depends directly on the level of secretory activity in the stomach. Thus, when in the case of chronic gastritis with secretory deficiency we noticed disappearance of the color in 40-45 minutes in 9 patients and 70-100 minutes in 58 patients, in 40 patients suffering from chronic gastritis with increased secretion disappearance of the indicator took

The acidity of gastric juice after a test meal following the method of N. I. Leporskiy in workers of the Samarkand Superphosphate Plant who suffer from chronic gastritis (P less than or equal to 0.05)

(1) Исла	(2)	Число обследо- ванных	(3) Общая кислотность			
			0-20	21-40	41-60	61-100
(5) Основные		102	36,3 ± 4,80	20,6 ± 4,00	8,8 ± 2,61	34,3 ± 4,50
(6) Прочие		16	31,2 ± 3,40	18,8 ± 3,20	18,8 ± 3,21	31,2 ± 3,90
(7) Контроль		10	—	30,0 ± 4,59	70,0 ± 4,60	—
(8) Итого		128	32,8 ± 4,20	21,1 ± 3,60	14,9 ± 3,30	31,2 ± 4,20
			(4) Свободная кислотность			
			0-10	11-20	21-40	41-80
(5) Основные		102	37,3 ± 4,80	19,0 ± 3,80	8,8 ± 2,60	34,3 ± 4,71
(6) Прочие		16	25,0 ± 2,50	25,0 ± 2,50	18,8 ± 3,10	31,2 ± 3,20
(7) Контроль		10	—	90,0 ± 3,00	10,0 ± 3,00	—
(8) Итого		128	32,8 ± 4,20	25,8 ± 2,60	10,2 ± 2,60	31,2 ± 4,31

Key:

- | | |
|--------------------|------------|
| 1. Shops | 5. Main |
| 2. Number examined | 6. Other |
| 3. Total acidity | 7. Control |
| 4. Free acidity | 8. Total |

80 to 115 minutes, and in 12 patients with normal secretion it took 70-100 minutes. In this way a retardation of the stomach evacuatory function was determined in 32 patients (27.1 percent) of the 118 examined, acceleration of the evacuatory function was determined in 36 (30.5 percent) and there was no disturbance of this function in 50 (42.4 percent). In addition it should be mentioned that when patients suffering from chronic gastritis with a secretory deficiency were given X-rays, a reduction of the stomach tonicity was noticed and the evacuation of barium from the stomach was accelerated, while in the case of increased secretion the evacuatory function of the stomach was somewhat reduced. The results of the study of secretory and peristaltic stomach functions together with data from other objective methods of study made possible the determination of a direct relation between the basic complaints of patients and the nature of stomach secretory activity. For chronic gastritis with a secretory deficiency (52 patients) the main complaints were of pain in the epigastric region (84.6 ± 3.2 percent), reduced appetite (79.4 ± 5.9 percent), growling stomach (72.7 ± 1.6 percent), bad taste in the mouth (72.2 ± 5.7 percent), nausea (63.6 ± 5.9 percent), eructation (57.9 ± 6.3 percent), vomiting (50.0 ± 3.0 percent), emaciation (42.4 ± 6.4 percent) diarrhea (36.4 ± 5.8 percent), general weakness (42.4 ± 6.4 percent), depression (39.4 ± 6.0 percent), reduced work activity (18.2 ± 4.8 percent) and heartburn (4.5 ± 2.4 percent).

The main complaints of people suffering from chronic gastritis with increased secretion (66) were of pain in the epigastric region (94.6 ± 3.20 percent), heartburn (88.6 ± 4.60 percent), increased appetite (84.6 ± 3.20 percent), nausea (69.2 ± 6.70 percent), eructation (55.9 ± 6.91 percent), irritability (36.5 ± 6.80 percent) and vomiting (31.9 ± 3.10 percent). All patients received complex hospital treatment. As a result of this there was a significant improvement of the general condition in 87.0 percent of the patients and the secretory function of the stomach was normalized in 36.8 percent. All of the patients are on the dispensary register at polyclinic No 4 of the Samarkand city medical center.

We did not remotely think that all cases of chronic gastritis which we detected in factory workers were connected with the health hazards of superphosphate and sulfuric acid production. At the same time, the role of these factors in the etiopathogenesis of chronic gastritis of a toxicochemical nature deserves serious attention. At the present time the plant is being fundamentally renovated, living and working conditions for workers and employees of all the factory shops were significantly improved, and special and dietary nutrition was fully introduced. Physiotherapeutic and hospital-health resort treatment have come to be extensively applied. The concentrations of dust-gas mixture are significantly reduced in the reconstructed shops. All of this together with an improved dispensary system for patients and well timed in-patient and out-patient clinical treatment will lead to a reduction of the sick rate in general and of chronic gastritis in particular.

Thus, chronic gastritis was detected in 128 (6.9 percent) of 1854 workers and employees of superphosphate and sulfuric acid production. The disease was more than twice as frequent in workers of the main shops as among workers and employees in other shops of the plant.

Clinical and X-ray studies of the 118 patients led to the determination of chronic gastritis with increased secretion in 52 (44.1 percent) and with secretory deficiency in 66 (55.9 percent)--16 (13.6 percent) of them suffered from histamine-resistant achlorhydeia. The disease was frequently observed in workers who had worked 4 years or more in shops with conditions injurious to health.

Among the 118 patients with chronic gastritis in 62 (52.5 percent) the gastric secretions were labile, in 29 (25.8 percent) they were inert, and in 27 (22.9 percent) they were isosecretory. Disturbance of the secretory function led to disturbance of the peristaltic function of the stomach in 68 (57.6 percent) of the patients.

When periodic medical examinations are conducted it is necessary to examine the functional state of the stomach in workers and employees who have worked for 4 years or more in the main shops of superphosphate plants. This will permit early determination of the diagnosis "primary chronic chronic gastritis, possibly of chemotoxic nature" and the use of a complex of prophylactic and medical sanitation measures.

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SOME ASPECTS OF ELECTROPHORESIS OF ENZYME PREPARATIONS

Moscow VOPROSY KURORTOLOGII, FIZIOTERAPII I LECHEBNOY FIZICHESKOY KU'L'TURY
in Russian No 2, 1979 pp 13-16

[Article by A. N. Obrosov and K. A. Anan'yeva, Central Institute of Health
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submitted 30 Nov 78]

[Text] Successes attained in enzymology, which permitted it to master the
industrial production of a series of enzymes in the form of well-purified
crystalline preparations, formed the basis for the widespread application
of enzymes in medicine, not only for diagnosis but for therapeutic
purposes.

Electrophoresis of enzyme preparations, which has advantages over the
parenteral method of administration, is receiving wider and wider use in
the clinic.

Electrophoresis of trypsin, chemotrypsin, hyaluronidase is now being
successfully used by clinicians of various profiles.

In contrast to other pharmacological agents, enzyme preparations are able
to exert selective action on strictly defined complex tissue structures
and accelerate their conversion into simpler compounds, by virtue of their
pronounced enzymatic specificity. Enzymatic lysis of large protein and
mucopolysaccharide complexes in the presence of direct current improves
tissue function in the reaction zone by reducing its density, intensifying
tissue permeability, improving microcirculation. This forms the basis for
such clinical effects as anti-inflammatory and anti-edema effects, sof-
tening of infiltrates, lysis of thrombotic formations, detachment of
necrotized tissues, etc.

The physical and chemical properties of enzymes, mainly amphoteric
polyelectrolytic nature, i.e., the relationship of the sign of their
charge on the concentration of hydrogen ions in the medium, engenders the
methodological aspects of electrophoresis of these substances. One of
these is the use as solvents of specific buffer mixtures which reliably

support stability of the total electrical charge of the enzyme. In theory, considering the pH of the working solution, electrophoresis of enzymes is possible when either pole is used. This in no way means that the pole can be selected arbitrarily for electrophoresis of a certain enzyme preparation, or be guided only by the quantitative indicators of electrophoretic mobility of the preparation (A. N. Boytsov; K. N. Veremeyenko). For enzymes this criterion is not decisive, since the catalytic activity of these substances is usually high and can show up at insignificantly small concentrations. The isoelectric point of the enzyme can only be used as an approximate reference point. According to the accepted scheme, when the pH is below the isoelectric point an enzyme has a positive charge; if it is higher, the charge is negative. In reality, however, as might be shown by the research of A. A. Bayev, these patterns can be different. With respect to trypsin, which is isoelectric at a pH of 10.7, it has been shown that in a pH 9.0 borate buffer it has both a positively and negatively charged form (K. A. Anan'yeva). The results of Hakim et al., who detected negatively charged trypsin even farther from the isoelectric point--at pH 5.0--are still more unexpected. Consequently, the isoelectric point can only be used as a relative criterion of the method.

For methodological conditions of electrophoresis of enzyme preparations, the aspects of the mechanism of action of a specific enzyme, we believe, are much more important.

According to modern ideas on enzymatic catalysis, one of the substantive stages of the catalytic reaction is the formation of the enzyme-substrate complex which occurs as a result of electrostatic interaction between the active center of the enzyme, which has a certain charge, and the oppositely charged functional segments of the substrate molecule attacked by the enzyme (M. V. Vol'kenshteyn; O. M. Poltorak and Ye. S. Chukhray). Proteolytic enzymes, trypsin and chemotrypsin, have negatively charged active centers which interact with substrate segments carrying positive charges (I. I. Berezin and K. Martinek; Mares-Conia and Shaw; Keil; Seydoux and Von, etc.). The importance of the presence of these electrostatic relationships has been shown for the manifestation of trypsin's and chemotrypsin's catalytic function (A. A. Klesov et al.; Benoiton and Deneault; Bode et al.; Quast et al.; Schoelmann).

As these data suggest, in order to preserve the natural negative charge of active centers of the enzymes in question and their reactivity, these enzymes must be dissolved for electrophoresis in an alkaline medium and the cathode must be used as the active electrode. There is also an extremely meaningful reason in favor of the expediency of using trypsin and chemotrypsin in anionic form: inhibitors contained in the blood serum which suppress the action of these enzymes are also negatively charged (T. I. Bogacheva et al.). It goes without saying that the dominance of a negative charge in the enzyme will hinder the retarding effect of the inhibitors. Thus it is most justified to use electrophoresis of trypsin and chemotrypsin from the cathode and dissolve the enzymes ex tempore in a

weakly alkaline buffer (pH 9.0). Borate buffer is usually used: 6.2 Gm boric acid, 7.4 Gm sodium chloride, 3.0 Gm sodium hydroxide, 500 milliliters distilled water. The danger of the untoward effect of an alkaline medium on these enzymes seems to have been exaggerated. According to Wang and Carpenter, if trypsin retains 99 percent of its initial activity in an acid medium, in an alkaline solution at pH 9.0 its activity remains high (98 percent) and only at pH 10.7 does it fall to 81 percent. If the requirement is observed, obligatory in enzyme work, to dissolve the compound immediately prior to electrophoresis, the medium has a minimal effect on the enzyme.

Numerous published clinical observations confirm the efficacy of electrophoresis of trypsin and chemotrypsin: the overwhelming majority of clinicians use the anionic form of the enzyme coming off of the cathode.

Electrophoresis of preparations containing hyaluronidase is generally done from the anode with these preparations being dissolved in an acetate buffer which ensures that a positive charge predominates in the enzyme. We know that substrates which are lysed by hyaluronidase --hyaluronic acid, chondroitinsulfuric acids contained in connective tissue, are negative charged (A. Labori). These methods ensure the favorable conditions of interaction of hyaluronidase and connective tissue components. Thus in electrophoresis it is not efficient to use solvents where the hyaluronidase has a predominantly negative charge. The justification for conducting electrophoresis of preparations of hyaluronidase in its cationic form is based on the data of a series of physical and chemical studies (N. A. Kaplun; V. S. Ulashchik; K. A. Anan'yeva) and has been supported by the reports of many domestic and foreign investigators.

Some other biophysical aspects of enzymes are worthy of attention. They are inadequately known by physiotherapists, but are of specific value for practice. These substances are distinguished by low thermal stability. A temperature of about 37°C is optimum for most enzymes, whereas at high temperatures the enzyme can be instantaneously destroyed. We should also remember that they should be mixed but not agitated when the preparations are dissolved to avoid forming a froth, since many enzymes become denatured at the interfaces.

In summary, we should again emphasize the exceptional methodological uniqueness of electrophoresis of enzyme preparations. Data which have been accumulated to date on the medical application of enzyme electrophoresis indicate that it is a very promising method which merits further study in the future.

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PHARMACOLOGY

UDC 615.356:577.164.11].03:616.71/.72--007.24-085.838.7

ON JUSTIFICATION OF THE USE OF THIAMINE AND ITS COENZYME FORM IN PATIENTS WITH OSTEOARTHRITIS DEFORMANS DURING PELOTHERAPY

Moscow VOPROSY KURORTOLOGII, FIZIOTERAPII I LECHEBNOY FIZICHESKOY KUL'TURY in Russian No 2, 1979 pp 43-47

[Article by I. L. Pshetakovskiy, head, Arthrology Clinic of Odessa Institute of Health Resort Treatment]

[Text] In this report the results of a study of the effect of a course of mud applications on several indicators of thiamine metabolism in patients with osteoarthritis deformans will be presented.

The essence of the biological activity of thiamine consists in the fact that it participates in metabolism as a coenzyme. Thiamine acquires its biological activity in the intestine, liver, kidneys and other organs during the addition of two molecules of phosphoric acid (phosphorylation). This compound is a diphosphoric ester of thiamine --thiamindiphosphate. Since this substance is a coenzyme of carboxylase, it has also received another name--cocarboxylase. According to the number of phosphoric acid molecules added to thiamine, thiaminemonophosphate, thiamine diphosphate and thiamine triphosphate are formed.

Thiamine metabolism was studied according to data on the content of thiamine, its phosphorylated forms in the blood, and vitamin B₁ in the urine. In addition, the quantity of thiamine introduced with food was considered. The content of free thiamine in the urine and plasma, TDP in regular blood elements and TMP in plasma were determined by the method of Jansen as modified by G. D. Yelisseyeva (1951, 1953). the quantity of thiochrome was definitively considered in the EF-3M electron fluorometer.

We have not encountered similar studies allowing for the gravity of the clinical and roentgenologic manifestation of osteoarthritis deformans in general or in pelotherapy in particular, either in domestic or foreign literature.

Some 58 patients (30 males and 28 females) with primary osteoarthritis deformans ages 32 to 70 years were studied. Some 27 patients had Stage I of the process (after the classification of N. S. Kosinskaya), 25 had Stage II and six had Stage III. The most common localization of the degenerative process were the leg joints, mainly knee and hip joints.

Upon admission patients showed noticeable deviations of concentration of both the free form of vitamin B₁ as well as its phosphorylated forms in the blood. As shown in Figure 1, the free thiamine level in patients with various stages of osteoarthritis deformans was elevated; it was most pronounced in Stage III of the disease. This sharp rise in the level of free plasma thiamine and constituent elements (statistically reliable) was noted in Stage II osteoarthritis deformans patients. On the whole in all stages of osteoarthritis deformans the concentration of free plasma thiamine and constituent blood elements was elevated.

Analysis of the content of cocarboxylase in the blood gave evidence that on the whole it was reduced in constituent blood elements, most clearly in Stage II of the disease.

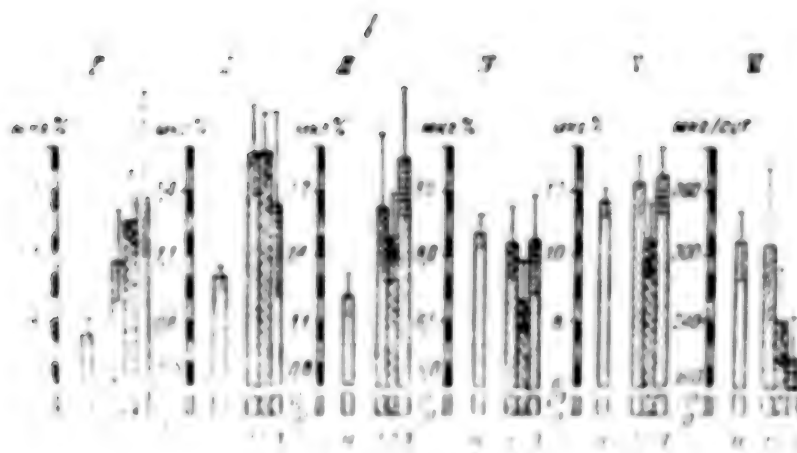


Figure 1. Osteoarthritis deformans patients' plasma content of free vitamin B₁ (I), thiamine monophosphate (III); blood constituent elements' content of free vitamin B₁ (II), thiamine diphosphate (IV); whole blood content of total vitamin B₁ (V); urine content of vitamin B₁ (VI). H = normal. 1, 2, 3 = I, II, III Stages of disease.

Study of the content of TMP in the same patients which, we know, forms as a result of hydrolytic decomposition of TDP, showed a rise in its level; this was most pronounced in Stages I and III of the disease. Urinary thiamine excretion (cf. Figure 1) decreased in proportion to the seriousness of the disease.

When there are specific shifts in the content of free thiamine and its phosphorylated forms, the concentration of total thiamine in the blood was not that different from that of healthy persons.

Thiamine metabolic shifts that were detected, which show up as a rise in the amount of free thiamine, TMP and a reduction of cocarboxylase content against a background of some decrease in urinary thiamine excretion, gave proof of the presence of disturbances in various links of thiamine metabolism and function.

If we consider the distinctive aspects of the pathologic process in osteoarthritis deformans, we can suggest that the pathogenesis of changes in cartilage and other articular components is somewhat predicated upon the thiamine metabolic and functional disturbances that we found. We know that the biological role of vitamin B₁ is chiefly governed by the participation of its pyrophosphoric ester in the function of the core of enzymatic systems of carbohydrate-phosphoric, protein and other kinds of metabolism.

Patients were treated with applications of mud from the Kuyal'nitskiy drowned river valley (temperature 40-42°C, duration of procedure 15-20 minutes, every other day, for a treatment course of 10-11 procedures). The medical treatment complex also included therapeutic gymnastics with moderate load, massage and climate therapy. Treatment resulted in an altered content of blood and urinary thiamine content: this suggested a favorable change in metabolism.

As shown in Figure 2, in Stage I of osteoarthritis deformans, following a course of mud applications the level of the coenzymatic form of thiamine mainly concentrated in the RBCs had risen in most patients. As concerns free thiamine, however, in most cases its level in the plasma and blood solids had dropped. The concentration of TMP in the plasma also fell during treatment. At the same time patients with initially elevated content of free forms of vitamin B₁ and TMP had favorable shifts towards its decrease and normalization. The urinary thiamine content under the same conditions was negligibly changed.

Overall analysis of data obtained on the state of thiamine and its coenzyme metabolism in patients with Stage I of the disease who have undergone mud treatment provides some proof of the organism's increased need for this vitamin. At the same time, a rise in the level of its pyrophosphoric ester in blood solids can significantly promote the activation of biochemical reactions catalyzed by the enzymatic systems, at whose active center lies cocarboxylase.

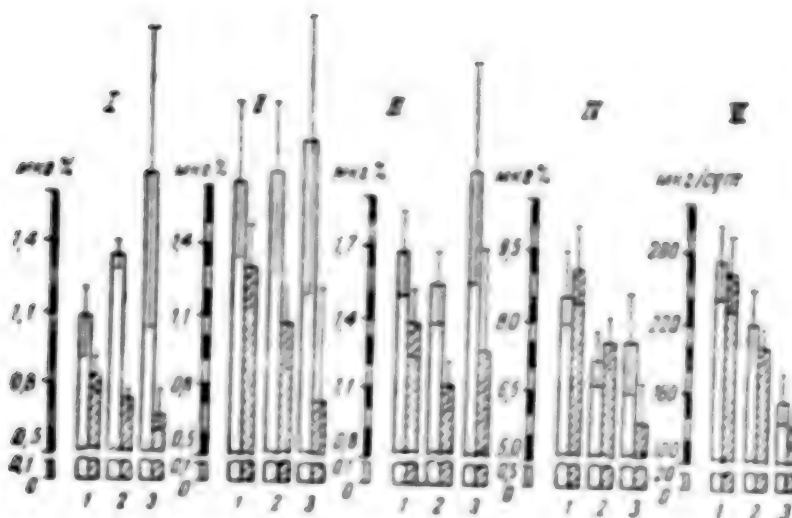


Figure 2. Change due to mud treatment in content of vitamin B₁ and its phosphoric esters in the blood and urine in osteoarthritis deformans patients. White bars: before; hatched bars: after mud treatment. Other notations as in Figure 1.

In Stage II of the disease, following the course of mud applications metabolism of thiamine and its phosphorylated forms underwent more pronounced changes. Against a background of a considerable reduction in the level of free forms of thiamine in the plasma and blood solids, there was a slight rise in the amount of pyrophosphoric ester of the vitamin in blood cells; excretion of vitamin B₁ with the urine fell to a greater degree than in patients with Stage I of the disease. Therefore, under these conditions there was a substantial deficit of the free form of thiamine. The mechanism of shifts in thiamine metabolism is most substantively represented by a decrease in processes of thiamine interchangeability in blood solids; activation of the thiamine kinase system of RBCs against a background of reduction in the rate of TDP hydrolysis plays an important role here. In addition, a decrease in the level of the free form of thiamine in the plasma and blood solids, in addition to its reduced urinary excretion, can be attributed to an intensification of binding of the vitamin by proteins of the internal organs.

Changes in thiamine metabolism following a course of mud treatment in patients with Stage III of the disease are characterized by the fact that in addition to a general decrease in blood thiamine content there appears a reduction in concentration of its pyrophosphoric ester. Thus at this stage of disease, mud treatment aggravates the thiamine deficit; this may be due chiefly to a disturbance of processes of phosphorylation and proteinization of thiamine. In addition, since urinary thiamine excretion is reduced at this point.

In analyzing the effect of a course of mud treatment on thiamine metabolism in osteoarthritis deformans patients, we should stress as a positive point the rise in level of thiamine's coenzyme form in blood cells in Stages I and II of the disease.

When thiamine metabolism is studied and its support of the organism is explained, one should take into consideration vitamin B₁ contributed by the diet and excreted with the urine. Furthermore, data are necessary on the caloric level of the diet, since the need for thiamine is connected with energy consumption; thus the amount of thiamine recommended has been adopted as equal to 1000 required calories. We know that they suggest giving thiamine in doses of 0.2 to 0.5 milligrams per 1000 calories to satisfy the need of healthy persons.

In the group average (58 osteoarthritis deformans patients), the caloric level of the diet was 3800 calories with a content of vitamin B₁ contributed by food equalling 1.52 milligrams; urinary thiamine content was 223 micrograms per day; urinary thiamine excretion was 14.4 percent.

During the treatment period, patients received the necessary quantity of vitamin B₁ with their diet (averaging 0.4 milligram per 1000 calories). Urinary excretion of thiamine following the course of mud applications was reduced. We can thus assume that pelotherapy elicits an increased need for vitamin B₁ and reduces its "saturation" level in the body. During mud treatment, the most significant manifestation of vitamin B₁ deficit occurred in patients with more pronounced clinical and roentgenologic symptoms of osteoarthritis. Thus after a course of mud applications, urinary vitamin B₁ excretion, in comparison with the amount provided by the diet, averaged 17 percent in Stage I patients, 13.4 percent in Stage II patients and 8.4 percent in Stage III patients with osteoarthritis deformans.

In studying the biostimulant effect of therapeutic mud, several investigators (L. Ye. Rozenfel'd; O. P. Verbitskaya, Ye. M. Driker and Ye. I. Rybinskaya; I. A. Ul'm; A. A. Nikiforova, 1964; A. I. Yermokhin and G. Ye. Barkovskaya; G. A. Gorchakova, and others) showed that its application elicits a considerable stress of metabolic processes in the organism. In view of this and current data in the literature on the role of vitamin B₁ in metabolic processes and the results of our research, we may assume that under the influence of a course of mud applications the utilization and consumption of thiamine by the tissues is increased; consequently there is a reduction in "saturation" of the organism with vitamin B₁ and its deficit increases in osteoarthritis deformans patients.

Analysis of the content of specific forms of thiamine in our examinees before treatment shows that it is mainly processes of phosphorylation of thiamine which are disturbed; these support the formation of the coenzyme form of the vitamin. Under these conditions, in order to have optimum support of the need of individual organs and systems for the coenzyme form of thiamine, the prepared phosphorylated form of the vitamin as co-carboxylase should be used, since the use of the preparation of free thiamine on a background of reduced phosphorylating ability of the tissues will not be able to effectively raise the level of its bioactive form in the organism.

As concerns the use of vitamins in mud treatment, it is also more advantageous to prescribe cocarboxylase, especially in severe clinical and roentgenologic manifestations of the disease: under these conditions, mud treatment can elicit a reduction in the concentration of the bioactive form of the vitamin in the blood and tissue.

Conclusions

1. Study of the content of thiamine and its phosphorylated derivatives in plasma and blood solids, and urinary excretion of vitamin B₁ in patients with osteoarthritis deformans revealed the typical aspects of disturbance of metabolism of this vitamin. The severity of observed changes depended on the gravity of the clinical course of the disease: as it increased there were more pronounced disturbances of thiamine metabolism.
2. In patients with osteoarthritis deformans, especially in the presence of pronounced clinical and roentgenologic symptoms of disease, the level of free thiamine and thiamine phosphate is elevated and the concentration of cocarboxylase is reduced against a background of insignificant change in the total level of thiamine in the blood; urinary excretion of vitamin B₁ is reduced.
3. Under the influence of pelotherapy, patients with osteoarthritis deformans show clear changes in the level and metabolism of free and phosphorylated forms of vitamin B₁.
4. Mud treatment, by intensifying processes of metabolism of thiamine and its coenzymatic form, substantially raises the organism's need for this vitamin. In such cases it is advisable to additionally provide cocarboxylase, especially to patients with pronounced clinical and roentgenologic symptoms of osteoarthritis deformans.

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VOLUNTARY SATURDAY LABOR IN CAUCASIAN MEDICAL INDUSTRY

In Tbilisi

Moscow MEDITSINSKAYA GAZETA in Russian 23 Mar 79 p 1

[Text] The kollektiv of the Scientific Research Institute of Vaccines and Serums of Minzdrav SSSR [Ministry of Health of the USSR] has decided to declare 21 April a day of maximum labor productivity. Production sector personnel will manufacture 26 types of preparations, which are produced in the institute, including such as gamma globulin, interferon, colibacterin, STI vaccine and typhoid, salmonellosis and dysentery bacteriophages. It is planned to turn out products valued at more than 10,000 rubles.

Construction is being completed in these pre-May days of a five-story production facility for the institute, and part of the personnel will be occupied on their voluntary Saturday workday with cleaning and putting in order the new building.

In Baku

Moscow MEDITSINSKAYA GAZETA in Russian 23 Mar 79 p 1

[Text] The Leninist voluntary workday in the Azermedtekhnik administration comes this year in connection with new facilities. A medical equipment storage facility has been built with an area of more than 800 square meters. On 21 April personnel there will be occupied with moving into the new center.

Starting operations nearby is a large medical equipment repair, assembly and technical maintenance plant with updated repair shops and employing modernized machine tools. On this "Red Saturday" 160 of its personnel will be helping construction workers complete their final operations, cleaning up trash and putting the area in order.

The traveling repair team is visiting medical facilities in Baku and other areas of Azerbaydzhan and performing repairs and preventive equipment maintenance free of charge.

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SOCIALIST OBLIGATIONS IN THE MEDICAL INDUSTRY FOR 1979

Moscow MEDITSINSKAYA GAZETA in Russian 23 Mar 79 p 1

[Article: "Work Without Any Falling Behind!, Socialist Obligations of Kollektivs of Enterprises, Sovkhozes and Organizations of the Ministry of the Medical Industry for 1979"]

[Text] Socialist obligations approved at a joint meeting of the ministry collegium and the presidium of the central committee of the medical workers' trade union.

In a great upsurge of political and labor enthusiasm, medical industry workers, like the entire Soviet people, are implementing the decisions of the 25th Congress of the CPSU.

Assuming ever broader dimensions in industry enterprises is the movement among production leaders who have taken on obligations to insure the accomplishment of five-year plan tasks by the 110th anniversary of the birth of V. I. Lenin.

Guided by the decisions of the November (1978) plenum of the CC CPSU; the conclusions and principles set forth in the speeches of Comrade L. I. Brezhnev, General Secretary of the CC CPSU and Chairman of the Presidium of the Supreme Soviet of the USSR and the decree of the CC CPSU and the Council of Ministers of the USSR on "Measures for Further Improving the Public Health," and developing socialist competition for the fulfillment and over-fulfillment of the 1979 plan, as well as for the four years of the five-year plan, medical industry workers are directing their efforts toward increasing production efficiency and improving the quality of production operations, accelerating scientific and technical progress, improving the organization of labor and management and achieving good final results.

Striving to add a worthy contribution to the accomplishment of the social and economic tasks of the Tenth Five-Year Plan and to insuring fuller satisfaction of the needs of public health and of

other consumers of medical industry products, kollektivs of enterprises, sovkhoses and organizations of the Ministry of the Medical Industry are assuming the following socialist obligations for 1979:

To complete ahead of schedule, on 30 December, on the basis of a fuller utilization of intensive factors in the development of production; the introduction of achievements from science and advanced experience into practical operations along with new equipment and technology; identifying and bringing internal resources into production operations; reducing losses and nonproduction-related costs; economically utilizing all material, financial and labor resources; efficiently utilizing working time and a widespread movement under the slogan "Work without any falling behind!," the tasks contained in this year's national economic plan related to the manufacture of the most important types of goods and to finished-product deliveries. To achieve product sales of 15 million rubles above the 1979 plan in the process of increasing the volume of industrial production 44.7 per cent as compared with 1975 as against the five-year plan target of 38.7 per cent and completing fulfillment of the plan for the 4 years of the five-year plan by the end of November 1979. To increase deliveries of medicaments to public health organizations by 55 per cent as compared with 1975 and those of items of medical equipment by 48 per cent; to increase the supply to agriculture of vitamins, chemical and pharmaceutical preparations and other products by 38 per cent.

To overfulfill the annual plan for increasing labor productivity by 5 per cent and to achieve by way of increasing the productivity of labor an increase in production volume of no less than 85 per cent. To achieve an increase in labor productivity for the 4 years of the five-year plan of 35.6 per cent as against the 31.3 per cent called for by the plan.

To produce no less than 80 tons more antibiotics, vitamins and synthetic medicaments than called for by established 1979 targets; over 30 million more packages of ready-to-use medicaments; over 1.5 million more ampules of injection solutions; and 3 million more rubles' worth of medical instruments, tools, apparatus and equipment, including 500 electrocardiographs, 270 photoelectric hemoglobinometers and 50 inhalation anesthesia apparatuses; and to grow and process no less than 1000 tons of medicinal plant raw material.

To manufacture in full volume and deliver at the specified times those items designated for the medical care of participants in the 1980 Olympics.

To achieve a further increase in return on investment* by means of improving utilization of fixed production capital and extending the shift-work system as applied to equipment operation. To expand capacity for the production of synthetic medicaments by 245 tons, of vitamins by 190 tons and of glass ampoules by 275 million pieces; to accelerate the introduction of capacity for the production of eyeglass lenses and medicinal preparations in aerosol containers.

To bring into production on the basis of creative collaboration between personnel of industrial enterprises, scientific research facilities and planning and design organizations 50 new medicaments and more than 90 types of glass or plastic instruments, tools, apparatus and other medical products, including an oscilloscope with discrete memory, an optical amnioscope with a fiber light guide, a scintillation gamma chamber, an osmometer and a fluoroscope.

To organize ahead of schedule the production of an antitumorigenic preparation, a hemostatic viscose antihemorrhagic, standard medical oscilloscope indicators and instruments for performing hematological analyses, a highly efficient hemodialysis apparatus, a microchamber for immunological reactions, "gamma" porcelain compound for making individual crowns in the practice of orthopedic stomatology and "Estedent" plastic teeth for juvenile prosthesis. To produce ahead of schedule the first industrial series of nicovite and ribovite preparations for the prevention and treatment of hypo- and avitaminoses.

To achieve further development in work directed toward increasing medicament shelf life and to extend as many as 2 or more years the useful life of no fewer than 80 medicaments.

To render required assistance to the Socialist Republic of Vietnam and the Republic of Cuba in the conduct of scientific research and in organizing industrial production of medicinal plants.

To achieve a further concentration and specialization in production and introduce integrated automated control systems; to reduce the labor intensiveness and production cost of manufactured output and thereby obtain above-plan profits of more than 3 million rubles.

To obtain by introducing on a comprehensive, integrated basis the products of scientific research and development efforts, measures to automate and mechanize production processes, a scientific organization of labor and by rationalization and the development of inventions a standard annual savings of no less than 40 million rubles.

To participate actively in the communist voluntary workday in honor of the 109th anniversary of the birth of V. I. Lenin. To manufacture on the voluntary workday products valued at more than 3 million rubles and earn an additional profit of approximately 300,000 rubles.

To implement in 1979 a complex of measures directed toward a reduction in the consumption of raw and other materials and of fuel and energy resources, achieving in the process savings in raw and other materials totaling 2 million rubles; 57 million kilowatt-hours in electrical energy; 210,000 gram-calories in thermal energy and 32,000 tons in standard fuel.

In demonstrating a concern for the improvement of professional skills on the part of personnel to raise the qualifications of 55,000 workers, engineering and technical personnel and employees and to organize systematic training in advanced work methods.

To work continuously further to improve working, living and recreational conditions for personnel. To open up for use or occupation residential living space totaling 59,000 square meters, children's preschool facilities for 650, workers' communal living quarters for 450, dining facilities for 1600, a recreational center for 120, a Pioneer camp for 100, a school for 192 and a dispensary for 200.

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DEVELOPMENTS IN TYUMEN' OBLAST PUBLIC HEALTH CARE DESCRIBED

Moscow MEDITSINSKAYA GAZETA in Russian 23 Mar 79 p 2

[Article by V. Shevchuk, chief physician of the Tyumen' Oblast clinical hospital: "Implement the Decree on Public Health, Tyumen': In Contact With Managers"]

[Text] Coming with the discovery of petroleum and natural gas deposits in Western Siberia and the process of opening them up for industrial exploitation have been radical changes in the economy and rhythm of life in Tyumen' Oblast. The towns of Nefteyugansk, Nizhnevartovsk, Surgut, Uray, Nadya, Megion, Uren-goy and a great number of workers' and operations settlements have grown up in the taiga and tundra. Railroads have been laid and powerful electric power stations, river ports and airports constructed.

The oblast public health system has been faced with the task of providing the population of the rapidly developing northern industrial regions with quality medical care. The oblast clinical hospital has become an organizational and methods training center in this effort.

Tyumen' public health organizers have had first of all to arrive at a common point of view with both oil and gas and main administration directors. Housing as well as hospitals have had to be built rapidly and simultaneously in the areas in which operations are underway.

Facing them initially was the task of setting up medical and public health service units and obtaining resources to provide for equipping them. This task can to a considerable extent be considered accomplished. There are now 10 medical and public health service units in operation in Tyumen' Oblast, including those in Nefteyugansk, Nizhnevartovsk, Surgut, Megion and in all petroleum industry enterprises. They have been provided with the latest equipment and are continually being developed and expanded. Their capacity averages 300-400 beds, and all have

specialized departments. This has created conditions for the organization of medical services for workers in industrial enterprises and for improving the quality of those services.

Cadres have presented another important problem. Medical personnel have come from the Baltic and Transcarpathian areas, the Caucasus and the Volga region. Personnel should have been trained to work under the conditions to be found in the North. In order to perform a preventive examination, for example, a shop physician had to be flown by helicopter to a borehole 280 kilometers away. Then too, medical and public health service unit physicians should also have mastered the basic principles involved in providing preferential care for workers in industrial enterprises.

The first step was taken in 1965 with the instructions issued by the oblast hospital governing the methods to be employed in organizing medical services for workers in industrial enterprises. We held and since then have continued every year to hold seminars for shop physicians. We devote our attention in these seminars to the problem of reducing the overall incidence of illness, as well as the incidence of job-related illness, to preventive examinations, to the dispensary system and to the overall planning of measures to improve the public health.

Then somewhat later we began the practice of holding systematic training for the chief physicians of medical and public health service units and their assistants. Their attention has been focused on organizational problems as well as questions related to the medical examination to establish fitness for work and the development of specialized medical care. Participating in this training in addition to specialists from our hospital have been scientists from the Tyumen' Medical Institute and the Sverdlovsk and Ufa Scientific Research Institutes of Industrial Hygiene and Occupational Diseases.

These many seminars have been directed toward a single goal: to contribute to improving the quality of medical care.

For the purpose of providing consultative services in remote areas of operations, including points along the lengths of oil and gas pipelines both in operation and under construction, we regularly send out special medical teams equipped with a mobile laboratory. We transport them by airplane and helicopter, by motorboat and launch on the Ob' and Konda Rivers and by tractor-trailer rigs. Information concerning the results of the teams' work is then always heard at hospital council and oblast public health department meetings.

The oblast public health department and the oblast clinical hospital are now advancing a new task to the forefront--the reduction of the incidence of illness among petroleum, gas and lumber industry workers by means of improving working conditions and the introduction of an entire program of measures designed to improve the public health. This is reflected in the five-year plans which the oblast hospital draws up together with main administrations, industrial association management personnel and trade union committees.

We have drawn up plans like this for the Tenth Five-Year Plan together with the main administrations of petroleum and gas extraction operations (Glavtyumen'neftegaz) and main pipeline construction (Glavsibtruboprovodstroy), Glavtyumen'neftegazstroy, the Tyumen'gazprom and Tyumen'lesprom industrial associations and other organizations.

Involving the public health service in the process, the oblast hospital is developing a program of measures directed toward improving therapeutic and preventive services, the prevention of industrial accidents and occupational diseases. Industrial departments are working out the means to be employed in mechanizing and automating labor-intensive processes, the construction of therapeutic and preventive care facilities and sanatoriums, in setting up environmental protection laboratories within enterprises and so forth.

We can take for an example the comprehensive five-year plan for the oblast hospital and Glavtyumen'neftegaz drawn up with the participation of the oblast committee of the petroleum and gas industry workers' trade union. This is a rather bulky little volume numbering 13 sections. Here is the title of only one of them: "List of Facilities Out of Compliance with Requirements of Labor Safety Regulations and Standards." By the name of each facility is the date on which it was shut down or on which improvements were made along with the amount allocated for this purpose. There are special sections providing for the reduction of noise, vibration and gas emission levels. Operations have been scheduled for the construction and expansion of 20 treatment and preventive care facilities. These include not only those belonging directly to the medical and public health service unit, but a milk-processing facility, a public health epidemiological center and a tuberculosis clinic. Already under construction are a children's sanatorium near Tyumen', the Mother and Child pension in Tugay and other health-care facilities.

Oblast hospital specialists regularly go out to the localities, where they check on the implementation of overall plans and the medical and public health service units' work in providing for systematic observation and periodic examination of the population [dispanserizatsiya], reducing the incidence of illness and in certifying fitness for work.

The efforts which have been undertaken so far have made it possible to achieve a reduction in the incidence of illness involving temporary work disability within the oblast as a whole as well as within individual branches of industry.

Where once the small public health service cars stood near the geologists' tents there now rise up-to-date polyclinics and permanent hospital facilities with specialized departments and offices. But despite how well they are equipped, many of them (because of the small size of northern cities) do not and cannot have a full range of specialized departments. We think, therefore, that what is needed in addition to the further development of medical and public health service units is a hospital constructed as a cooperative facility which would provide specialized medical care for workers in industrial enterprises of the North and members of their families. Such a hospital would also become a center for work in the areas of organization and methods training.

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CSO: 1870

HYGIENIC REGULATION OF TRIMETHYLBENZENE IN POLYMER CONSTRUCTION MATERIALS

Moscow GIGIYENA I SANITARIYA in Russian No 5, 1979 pp 15-17

[Article by N. Ye. Dyshinevich, All-Union Scientific Research Institute of Hygiene and Toxicology of Pesticides, Polymers and Plastics, Kiev]

[Text] Trimethylbenzenes: mesitylene and pseudocumene are two of a number of identified volatile compounds excreted by polyvinyl chloride (PVC) (A.P. Filippov et al., A.P. Filippov). No data has been reported so far on the permissible excretion levels (PEL) of these compounds, needed for hygienic evaluation of PVC materials. Therefore, an investigation was carried out to obtain hygienic substantiation for the PEL of mesitylene and pseudocumene.

On the basis of their physical-chemical constants mesitylene and pseudocumene have been assigned to the 8th group of the nonelectrolyte system of N.V. Lazarev; they are secondary type narcotics. Coefficients of vapor solubility in water for mesitylene and pseudocumene are 1.1 and 1.4 respectively. These data were considered in planning and carrying out the toxicologic experiments.

Toxicologic properties of mesitylene and pseudocumene were studied in acute and chronic experiments. White randomly bred rats were used, weighing 150-165 g in the acute tests and 110-115 g in chronic experiments. In the acute experiments (4 hrs effect) the LD₅₀ for mesitylene and pseudocumene was 24.0 ± 0.78 and 18.0 ± 0.62 mg/l respectively. Because of the low solubility coefficient of mesitylene and pseudocumene vapors in water, the experimental animals reached quickly an equilibrium between the arterial blood and inhaled air content of these chemicals, so that symptoms of intoxication were evident within minutes of the exposure to the agents. The threshold for acute effect of both mesitylene and pseudocumene in white rats was 800 mg/m³.

In chronic experiments the effect of mesitylene and pseudocumene was studied on 60 rats exposed to round the clock inhalation of these agents for 4 months. There were five groups of 12 animals each. The rats in groups 1 and 2 were exposed to mesitylene at a dose of 20.0 ± 1.2 and 2.0 ± 0.5 mg/m³ respectively, groups 3 and 4 were exposed to identical doses of pseudocumene and the fifth group served as control. Relating to the intoxication studies with benzene derivatives, the following parameters were determined: additive

threshold effect (SPP), blood enzymes activity (urocaninase, catalase, cholinesterase), the content of urobiline, sulfate fractions and N-methylnicotinamide in urine, composition of the peripheral blood (hemoglobine, erythrocytes, leucocytes), and the weight of animals, as well as their behavior. The results obtained were analyzed statistically (Student test).

The air in the intoxication chambers was analyzed spectrophotometrically to determine the vapor content of the test agents (R.V. Gorskaya et al). It has been established that during the entire chronic experiment both mesitylene and pseudocumene at the dose of 20.0 mg/m^3 showed statistically significant changes in some test parameters of the 1 and 3 groups of animals in comparison to the controls. Experimental results are reported in the table.

The table shows that the animals from groups 1 and 3 throughout the entire experiment exhibited consistent changes in the SPP, indicating a disturbance in the CNS functions. Analysis of the data on detoxication of the metabolic products of both compounds showed an increase in organic sulfates and elevated sulfate index in the urine of test animals. Analysis of liver secretory function showed moderate urobilinuria in the second month of the experiment among the 1 and 3 group of animals (the first group 10.4 ± 0.2 rel. units, the third group 10.8 ± 0.2 rel. units, control 5.1 ± 0.2 rel. units; $p < 0.05$). A more informative indication of the effect of these agents on the activity of liver was obtained from the determination of an organ specific enzyme--the urocaninase. It has been established that in the final phase of this experiment the animals of the 1 and 3 group showed weak activity of this enzyme (1st group 3 rel. units, 3rd group 3.6 rel. units, control - 0).

Analysis of the excretion of urinary N-methylnicotinamide in the 1 and 3 groups showed a statistically significant drop during the entire experiment. This change was persistent and at the end of the experiment, the first group showed $58.4 \pm 10.4 \text{ mg/l}$, the 3rd - $69.6 \pm 0.2 \text{ mg/l}$, and the control - $150.0 \pm 18.2 \text{ mg/l}$ ($p < 0.05$). These changes must be due to the disturbance of the biosynthesis of N-methylnicotinamide caused by increased demands to form sulfuric acid, needed for the detoxication of the metabolic products of mesitylene and pseudocumene. The same animals also showed a drop in catalase activity (45 and 56% in the fourth month respectively for the 1 and 3 group, $p < 0.05$). Evidently the inhibition of the activity of this enzyme reflects a protective-adaptive type mechanism aimed at inhibiting the formation of toxic phenolic metabolites in the organisms from mesitylene and pseudocumene (A.N. Bakh).

There were no changes observed in the morphologic composition of peripheral blood, indicating that mesitylene and pseudocumene were similar to lower alkylbenzenes, which are not myelotoxic. No changes were observed in the activity of blood cholinesterase nor in the body weight.

The 2.0 mg/m^3 doses of mesitylene and pseudocumene showed statistically significant changes only in the SPP towards the end of the experiment: in the 2nd group of animals it was 5.4 ± 0.3 rel. units, in the 4th - 4.6 ± 0.3 rel. units, and in the control - 3.4 ± 0.3 rel. units ($p < 0.001$).

Some intoxication indicators for the inhalation effect of mesitylene and pseudocumene at a concentration of 20.0 mg/m³

(1) Вещество	(4) Срок сле- жения, мес	(5) Статис- тический показатель	(6) СПП, усл. ед.		(7) Содержание органических сульфатов в моче, мг/л		(8) Сульфатный индекс мочи, %	
			опыт	контроль	опыт	контроль	опыт	контроль
(2) Мезитилен	1	$M \pm m$ P	3,8±0,1	3,0±0,1	680±50	150±20	23±1,6	9,2±0,8
	2	$M \pm m$ P	3,8±0,1	3,0±0,1	630±30	160±40	23±1,8	9,9±0,6
	3	$M \pm m$ P	5,1±0,2	3,2±0,1	640±32	192±47	25±2,2	9,3±0,9
	4	$M \pm m$ P	5,3±0,2	2,9±0,1	702±24	188±38	28±1,8	9,9±0,6
(3) Псевдокумол	1	$M \pm m$ P	3,8±0,1	3,2±0,1	682±40	150±20	20±1,2	9,2±0,9
	2	$M \pm m$ P	5,3±0,3	3,1±0,1	626±24	160±40	22±1,2	9,9±0,6
	3	$M \pm m$ P	3,9±0,2	3,2±0,1	642±34	192±47	26±1,6	9,3±0,8
	4	$M \pm m$ P	5,4±0,1	3,4±0,3	692±30	188±38	28±1,4	9,9±0,6

Key:

1. Compound
2. Mesitylene
3. Pseudocumene
4. Duration of experiment, months
5. Statistical indicator
6. SPP, rel. units
7. Control
8. Experimental group
9. Organic sulfate content in urine, mg/l
10. Control
11. Experimental group
12. Urinary sulfate index, %
13. Control
14. Experimental group

We have determined that using the classification of K.K. Sidorov, the biologic activity zones of mesitylene (12000) and pseudocumene (9000) makes them compounds with marked cumulative properties. On the basis of the material obtained, one must conclude that mesitylene and pseudocumene exhibit no effects on warm blooded animals of toxic nature.

In summary, the effective dose of mesitylene and pseudocumene is 20.0 mg/m³, while the 20.0 mg/m³ concentration could be considered to be close to the threshold level under the experimental conditions used.

In determining the PEL of these compounds from polymer construction materials we considered the following aspects. According to the results obtained, these compounds show moderately toxic properties (according to the classification approved by the plenary session of the PDK section); they have a broad range of biological activity and definitely cumulative properties; in operations involving PVC linoleum, they contaminate the air of the living and working space, affecting not only debilitated and highly sensitive individuals (pregnant women, children, sick people, senior citizens) but also normal healthy people. Because of the fact that there is no single method for the determination of marginal coefficients suitable for the determination of the population based toxicology, we used a method proposed by K.K. Sidorov, including the determination of PEL, as a criterion of hygienic evaluation of polymeric construction materials. We recommend that the PEL for both mesitylene and pseudocumene should not exceed 0.01 mg/m³, this level having been approved by the USSR Ministry of Public Health.

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CSO: 1870

A PORTABLE SET FOR AIR SAMPLING

Moscow GIGIYENA I SANITARIYA in Russian No 5, 1979 pp 70-71

[Article by L.D. Giller, Road Sanitation Epidemiology Station of the Pridneprovsk Railroad, Dnepropetrovsk]

[Text] Until a short time ago, two individuals (usually a technician and an assistant) were needed to collect air samples on the Pridneprovsk Railroad for chemical control of the environment at industrial installations. One of them supported the cartridges and the absorbers in the respiratory zone of the workers, while the other monitored the electroaspirator, kept notes, etc. This approach required two workers to stay in the zone of the emission of harmful chemicals and dust, it led to static muscle tension due to the necessity of having to support the equipment for a prolonged time, in turn leading to increased fatigue, etc.

To eliminate these conditions we are proposing a portable stand for combination of the adsorbers and air-sampling cartridges (Fig 1). It consists of a support--a base bracing the cartridge and the adsorbers. The support is made of a commercial field photo-tripod. A portable tripod could also be used, after it would be braced at the collection point. The cartridge and the adsorber holders are made of wood, braced with a 2 mm thick steel band. The set weighs 2.25 kg with a tripod and 0.36 kg as a portable unit.

At the air sampling site the unit is assembled as follows. The technician sets up the tripod, screws on the base, on which the holder (or several holders) is placed, and finally, the absorbers or the cartridges are inserted and connected with the electroaspirators by means of rubber tubing.

The use of this portable stand made it possible for one technician to collect air samples on industrial sites, without staying in the zone of emission of dangerous chemical compounds or dust, nor having to hold the cartridges and the absorbers in the air. In addition, it is now possible to mark precisely the height of air sampling, to collect multiple samples from the same point, and several samples from different points at the same time. By installing several holders, the collection time could be shortened,

especially when large volumes of air are involved (for example, when determining the aerosol contents of lead, silicon dioxide, etc.). Introduction of this portable stand, simple in construction and operation, as well as inexpensive, led to improved quality and reproducibility of the performance of technicians at the sanitation epidemiology stations, and made their working conditions more acceptable.

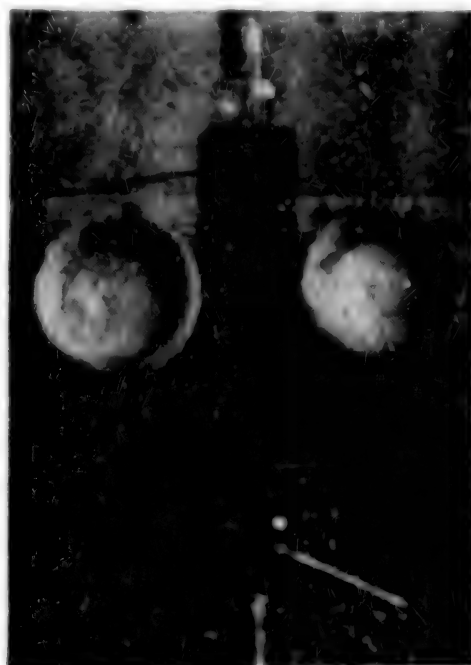


Fig 1. Assembled stand 1 - Tripod; 2 - base; 3 - holder 4 - absorber holder



Fig. 2. Air sampling with the portable stand 1 - assembled stand; 2 - cartridges; 3 - rubber tubing; 4 - aspirator

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UDC 613.167:621.315.1:614.875

**ELECTROMAGNETIC FIELD OF INDUSTRIAL FREQUENCY AS AN ENVIRONMENTAL FACTOR
AND ITS HYGIENIC REGULATION ASPECTS**

Moscow GIGIYENA I SANITARIYA in Russian No 5, 1979 pp 72-74

[Article by Yu. D. Dumanskiy, and Ye. V. Prokhvatilo, Kiev Scientific Research Institute of General and Communal Hygiene imeni A.N. Marzeyev]

[Text] Biologic aggressiveness of an electromagnetic field formed by electric power lines (EPL) creates serious problems for the hygienist concerned with protecting public health from its effects. This fact led to the standardization of the industrial frequency electromagnetic field (EMF), establishing it as a harmful professional factor (GOST 12.1.002-75 "Electric current fields of industrial frequency and of the voltage exceeding 400 kV"). However, this alone did not solve the problem, since the EMF affect not only the professionally exposed individuals, but also the population at large.

Starting in 1973, a research program was initiated at the Kiev Scientific Research Institute of General and Communal Hygiene imeni A.N. Marzeyev together with the Chair of General Hygiene of the Kiev Medical Institute (R.D. Gabovich and I.P. Kazyarin) aimed at establishing a scientific basis for the hygienic regulation of EMF of industrial frequency, covering the population at large, unrelated to professional servicing of the EPL and related electrical plants. A series of scientific and practical questions had to be solved: The distribution characteristics of industrial frequency EMF in the areas neighboring EPL with varying voltage (110, 220, 330, 500 and 750 kV), characteristics of the biological activity of EMF studied in experiments on warm blooded animals and volunteers hoping to determine the threshold and subthreshold levels of permissible exposure, and the formulation of hygienic requirements and recommendations on the distribution of high voltage EPL in populated areas.

Field studies on the determination of the distribution of industrial frequency EMF helped in establishing magnetic activity spread zones in the terrain neighboring the EPL routes (Table 1).

Table 1

The spread of industrial frequency EMF in the vicinity of EPL

Напряжение ЛЭП, кВ	Максимальные уровни ЭМП, кВ/м	Максималь- ные зоны распростра- нения ЭМП, м
110	3.3	10
220	4.0	20
330	4.9	25
500	10.5	45
750	15.5	60

Key:

1. EPL Voltage, kV
2. Maximum levels of EMF, kV/m
3. Maximum spread zones of EMF, m

The reported data indicate that individuals living close to EPL may well come under the influence of industrial frequency EMF of considerable strength, since there are no limiting measures even considered at this time.

Considering this situation, studies were performed on the effect of industrial frequency EMF using laboratory animals and volunteers. The experimental electric field was modelled on the principle of flatparallel fields with consideration of real conditions encountered by humans staying under the EPL trunk lines. The study with volunteers was performed under natural conditions. The EMF levels and the exposures were selected to represent real conditions corresponding to the problems being investigated. Table 2 shows experimental conditions of individual test runs and basic results.

On the basis of the data obtained, the range of the effect of industrial frequency EMF on human organism has been determined, establishing safety levels for different modes of action: 0.5 kV/m for round the clock systematic exposure, 5 kV/m for short duration daily exposure (not to exceed 2 hrs per day) and 12 kV/m for short duration occasional exposure (less than 1/2 hr per day).

These levels are recommended as maximum permissible levels for mixed population groups exposed for a long or short time to the effect of industrial frequency EMF; they have been accepted for implementation by the USSR Ministry of Energy. It should be noted that for the occasional exposure a level of 15 kV/m has been accepted since the energy experts considered the proposed 12 kV/m level to be too restrictive; it has been established for somewhat aggravated conditions not encountered in reality since the high voltage EPL pass through nonaccessible locations, excluding even sporadic exposure to people.

Thus, on the basis of literature data, including results obtained in the Kiev Scientific Research Institute of General and Communal Hygiene imeni

Table 2

Experimental Study of the Biological Activity of Industrial Frequency

EMF

(1) Серия	(2) Объект исследования	(3) Напряженность ЭМП, кВ/м	(4) Экспозиция в сутки, ч	(5) Продолжительность опыта	(6) Димитриушкинские показатели	(7) Минимальные дозы ЭМП, кВ/м	(8) Максимальные пороговые уровни ЭМП, кВ/м
I	Крысы (9)	0,1, 0,5, 1, 2, 5	22	6 мес (10)	(11) Поглощение и выведение ¹³¹ I щитовидной железой, активность холинэстеразы и дегидрогеназы, содержание сульфгидрильных групп, мочевины в крови и 17-кетостероидов в моче, параметры дыхания и фосфорилирования митохондрий головного мозга	1	0,5
II	Кролики (12)	0,1, 0,5, 1	22	3 мес (13)	(14) Электроэнцефалограмма, электрокардиограмма	1	0,5
III	Крысы (15)	1, 2, 4, 7, 15	2	5 мес (16)	(17) Умационно-пороговый показатель, латентный период безусловного рефлекса, активность холинэстеразы, содержание мочевины, остаточного азота, глюкозы в крови, баланс и межорганный распределение микроэлементов	7	4
IV	Добровольцы (20)	7, 12, 15	1/2	5 мес (18)	(19) Электроэнцефалограмма, объем оперативной памяти, способность к концентрации внимания, температура тела и топография кожных температур, содержание глюкозы, остаточного азота, мочевины, активность холинэстеразы крови	12	7
V		5	2	1 мес (21)	(22) Электроэнцефалограмма, объем оперативной памяти, способность к концентрации внимания, температура тела и топография кожных температур, содержание глюкозы, остаточного азота, мочевины, активность холинэстеразы крови	—	5
VI		12, 15	1/3 раза часовым интервалом (23)	1 мес (24)	(25) же	15	12
VII	Крысы (26)	0,5, 1, 5	22	3,5 (27)	(28) Проки спаривания, показатели массы потомства и их динамика, функциональное состояние яичников (течение эстрального цикла) и семенников (индекс сперматогенеза, соотношение числа мертвых и живых, нормальных и атипичных форм спермиев)	1	0,5

(28) Примечание. Исследования проведены сотрудниками лаборатории по гигиеническому изучению электрических и электромагнитных факторов Киевского научно-исследовательского института общей и коммунальной гигиены им. А. Н. Марзеева: Э. В. Прохвятило, Л. А. Томашевской, С. А. Любченко, Ю. И. Василенко, Л. Г. Андрияшко, В. Ф. Рудиченко, Л. К. Ершовой и аспирантом Киевского медицинского института И. П. Козыриным.

Key to Table 2:

1. Series
2. Study Group
3. EMF Voltage, kV/m
4. Exposure per day, h
5. Duration of the experiment
6. Limiting indicators
7. Minimal levels of active EMF, kV/m
8. Maximal levels with no EMF effect, kV/m
9. Rats
10. 6 months
11. Absorption and excretion of ^{131}I by the thyroid gland, activity of cholinesterase and dehydrogenase, sulfhydryl groups and urea present in blood, level of 17-ketosteroids in urine, respiratory and phosphorylation parameters in brain mitochondria
12. Rabbits
13. 3 months
14. Electroencephalogram, electrocardiogram
15. Rats
16. 5 months
17. Additive-threshold indicator, latent period of nonconditioned reflex, activity of cholinesterase, blood levels of urea, residual nitrogen and glucose, balance and distribution of microelements in the organs
18. 5 months
19. Ditto
20. Volunteers
21. 1 month
22. Electroencephalogram, operational memory capacity, ability to concentrate, body temperature, skin temperature topography, blood levels of glucose, residual nitrogen, urea, and the activity of cholinesterase
23. 3 times 1/2 hr with one hr break
24. 1 week
25. Ditto
26. Rats
27. Mating period, weight of the offspring and their dynamics, functional state of the ovaries (duration of the estrous cycle) and of testis (spermatogenesis index, ratio of live-dead and normal-abnormal semens)
28. Annotation. The following members of the Laboratory of Hygienic studies of Electric and Electromagnetic Factors, Kiev Scientific Research Institute of General and Communal Hygiene Imeni A.N. Marzeyev participated in the experiments: Prokhvatilo, Ye. V., Tomashevskoy, L.A., Lyubchenko, V.F., Yershova, L.K. and the candidate of Kiev Medical Institute Kozyarin, I.P.

A.N. Marzeyev, industrial frequency EMF should be viewed as a biologically active factor of the environment, currently regulated in the USSR. Further studies of industrial frequency EMF and of its source, high voltage EPL, are in progress, with the goal of refining the standards already developed,

determination of the relationship of the biological effect on the exposure level, the mechanism of action, and the effect of discharge currents. A broad spectrum of approximately similar studies is being carried out in the United States. A collaborative effort between the USSR and United States has been set up on the problem: "The biological effect of physical factors of the environment" with the goal of exchanging scientific information and cooperative experiments directed at the improvement of the sanitary conditions in the environment.

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CSO: 1870

UDC 613.34:628.1 (1-22)

HYGIENIC ASPECTS OF THE DESIGN, CONSTRUCTION AND OPERATION OF THE GROUP SYSTEMS OF WATER SUPPLY FOR AGRICULTURAL USE

Moscow GIGIYENA I SANITARIYA in Russian No 5, 1979 pp 7-11

[Article by Ye. V. Shtannikov, Ye. P. Sergeyev and G.I. Rozhnov, et al]

[Text] The construction program of the agricultural water delivery system is carried out on the basis of common water lines for industrial, agricultural and human utilization. The principle of a single rural water delivery system, based on the group systems of water supply for agricultural purposes, creates a material and technological basis for improvements in water delivery to major population centers, thus solving the problem of providing water for agricultural and human consumption in regions where such an operation is economically feasible.

As of now, some of the world's largest group water supply lines have been successfully operated in this country for a number of years, some of them stretching for hundreds and thousands of kilometers: the Ishymsk line 1749 km (supplying the Severo-Kazakhstanskaya, Kokchetavskaya and Kustanayskaya Oblasts), Bulayevsk line 1694 km (supplying Severo-Kazakhstanskaya, Kokchetavskaya and Omskaya Oblasts), and the Nurinsk, Seletinsk, Furmanov and Presnov lines.

Considering the large scale of these group systems for agricultural water supply and the proposed expansion, it appears necessary to solve a number of hygienic problems concerning the design, construction and operation of these systems in order to improve their sanitary reliability.

This report is the result of many years (1961-1976) of laboratory and field operations on the Ishymsk and Bulayevsk group water supply lines.

Group water supply systems consist of powerful, technically complex, installations with long water conduits interconnected with modern equipment for disinfecting water and for purification purposes, with numerous pumps lifting and transporting the water and creating considerable hydraulic drops and, finally, with various means for water intake.

The construction characteristics of such a system create specific situations affecting the quality of water (Ye. V. Shtannikov et al). Some of these are the length of trunk lines, extended contact of water with the pipes (sometimes lasting up to 8-10 days) in transit, high hydraulic pressures (up to 30 atm), operational characteristics including segments of stagnation, non-uniform utilization of water, structure and physical-chemical properties of the material used for preparation of the pipes, etc.

The experience gained in operating group water supply systems shows that long distance water transportation via metal pipe lines results in deterioration of organoleptic properties coupled with changes in bacterial composition, and increasing levels of iron (Ye. V. Shtannikov et al). A direct relationship has been noted between these changes and the distance from water purification stations. These changes occur at quite a significant level: odor increases up to 4 points, turbidity by 5-6 mg/l (in select cases up to 10 mg/l). Along with increased iron content, the level of other elements (Zn, Pb) is increased. In comparison to the starting levels, this increase is significant, but it does not exceed the maximum permissible levels.

Bacterial composition of the water is deteriorating, the highest contamination being observed in the separation network. Some of the test samples falling short of the standard requirements (according to the coli titer) reach the level of 50-632. S.N. Cherkinskiy was correct in noting that the bacterial contamination is of a secondary nature, being related to unsatisfactory technical and sanitation maintenance of the system, and a disregard to the sanitation operational rules. In addition, the existence of pressure drops in the pipe line system (formation of negative pressure) supports the possibility of secondary contamination.

Determination of the quality of water in the Ishymsk and Bulayevsk pipelines (Ishym river and Sergeyev water reservoir) showed that their F content was low, less than 0.5 mg/l. Therefore, water fluoridation was introduced into the Ishymsk pipeline in 1966, and into the Bulayevsk system in 1969. The studies have shown that in the starting water reservoirs the content of F was optimal, dropping to 0.3-0.4 mg/l after passage through long trunk lines.

In an attempt to determine the reasons for the lowering of F concentration along the route, the stability of this element was studied under various operational conditions as well as in the laboratory. From the hygienic point of view, the stability of F in water is an important question with distinct theoretical rationale. It is well known that F, being an element of the VII group of the periodic system may react under specific conditions with Fe (primarily the trivalent), Ca^{2+} , Mg^{2+} , forming complex insoluble compounds.

To study the effect of Fe compounds on the stability of F levels, water samples were prepared under laboratory conditions containing different concentrations of Fe (Fe^{2+} , Fe^{3+}) and F, ranging from 1 to 5 and from 1-3 mg/l respectively. The quantity of these elements was determined after 1.5 and 15 days.

It has been established that the stability of F depends on its initial concentration and on the concentration and valence of Fe. The largest drop in F-ion concentration in water was noted (down to 0.1 mg/l, i.e. by more than 90%) in water containing 1.0 mg/l and 5 mg/l of F. A direct relationship was noted between the concentration of F-ions and the valence of Fe. At low F concentrations its stability does not depend on the valence of Fe, but with increased F content in water, its concentration drops faster in presence of trivalent Fe.

To study the effect of water hardness on the stability of F, artificially modified water with varying degree of hardness was prepared (2-14 mg-eq/l) by adding Ca and Mg ions at a ratio of 1:1. It has been established that the drop in the concentration of F depends on its contact time with the salts, on its initial concentration and on the water hardness, principally due to the Mg ions (cf. Table). The maximum decrease in the concentration of F-ions (80-90%) was found after 15 days in water hardened primarily by the Mg^{2+} ions, with the initial concentration of F ions being 0.5 and 1.0 mg/l (cf. Table). Thus, in presence of the "hardness" salts, the concentration of F drops because of the formation of complex salts with Ca, Mg and Fe.

The effect of water hardness (7 mg-eq/l) on the stability of F

(b) Содержание F-иона, мг/л	Жесткость воды (a)							
	Ca ⁺⁺				Mg ⁺⁺			
	Содержание F, мг/л (c)							
	(d) исход. 5 дней	(e) содержание ионизир. решка, %	(f) исход. 15 дней	(g) содержание ионизир. решка, %	(h) исход. 5 дней	(i) содержание ионизир. решка, %	(j) исход. 15 дней	(k) содержание ионизир. решка, %
0.5	0.5	—	0.4	20	0.4	20	0.1	80
1.0	0.96	4	0.86	14	1.0	—	0.1	90
2.0	1.9	5	1.7	15	1.96	2	0.7	75
4.0	3.8	5	3.6	10	3.9	2.5	3.2	20

Key:

- | | |
|--------------------------|--------------------------|
| a. Water hardness | g. concentration drop, % |
| b. F-ion content, mg/l | h. in 5 days |
| c. F content, mg/l | i. concentration drop, % |
| d. in 5 days | j. in 15 days |
| e. concentration drop, % | k. concentration drop, % |
| f. in 15 days | |

Theoretically, one could conceive of the so called threshold concentration of Fe hardness, which when exceeded, could lead to the lowering of optimal F concentration. For Fe, this concentration is 3-5 mg/l for a hardness of 7 mg-eq/l. The effect of the latter on this process, including the effect of various forms of this element, and the effect of the relationship of Ca to Mg, need further refinement and additional studies.

Determination of the content of F in Islyumsk water supply system under various operational conditions identified a relationship between the concentration of this element and the water flow rate. With a rate of 0.4-0.4 m/sec (water delivery rate of 40%), a 70-10% drop in F concentration in water was noted, but with conditions close to the projected ones for the system (water delivery rate 80-85%), the F level remained stable, its content at a number of distant points from the main installations remaining within the range of the original reservoir.

The technical procedures used for the improvement of water quality (including the common methods of clarification, bleaching, sedimentation, filtration, disinfection and chlorination) assure that the water obtained through the group water supply system corresponds to standard requirements. The potential for secondary bacterial contamination of drinking water at various pipe line segments calls for hygienic evaluation. The measures selected for water disinfection must provide long lasting, highly effective bactericidal activity (resulting from the stable F forms) with low corrosive effect upon the pipe line material.

Ammonium chloride treatment of water (S.N. Cherkinskiy and N.N. Trakhtman) stabilizes residual Cl in the water supply system, assuring improved bacteriological indices and organoleptic properties of water, and slows down the corrosion of pipe lines.

Studies carried out at the Islyumsk water supply system showed that, from hygienic aspects, ammonium chloride treatment of water should be preferred over the common chlorination. One hundred km from the main installation, the level of residual Cl in the Islyumsk system was 0.7-0.8 mg/l and only 24% of the test samples were not within the standards prescribed by GOST 2874-73 for bacteriological indicators. In contrast, water in Bulayevsk supply system, where chlorination alone was used, showed no residual Cl 50 km from the main installation and the number of test samples failing the standard bacteriological requirements was 96.2%. Ammonium chloride treatment also reduced the Fe content in water 15.5-2 fold) maintaining its concentration stable at all segments of the water supply system.

To achieve the same goal, water could be silicated (i.e., chemicals could be added to water--principally Na silicates) forming a protective film and thus slowing down the corrosive process and the penetration of the corrosion products into the water. Water silication was studied at the Bulayevsk water supply system. For seven days 80 and 40 mg/l of Na silicate was added to water (calculated on the basis of SiO_2). Corrosive processes were slowed down effectively up to 40-50 km from the point of Na silicate introduction; and the film formed showed protective action 8 days after the addition was stopped. Considerable drop in the Fe content was noted and the organoleptic properties of the water were improved.

Considering the current concepts of the role of threshold levels of various chemicals on water purification installations (such as the toxic agents, surfactants, and the products of their metabolism), the hygienic approval of the effectiveness of the water purification system became increasingly important since it has been shown that the water supply systems are very

ineffective as far as the chemical poisons, surfactants and their metabolites are concerned.

Organization of group water supply systems is extremely important in the effort to lower the intestinal infections in rural areas. The morbidity among the population of Severo-Kazakhstanskaya Oblast along the Ishym river was studied during the last 5-6 years. It has been shown that intestinal infections in this region showed a marked tendency to decrease, by a factor of 1 1/2 and more. These data show then, that from the antiepidemic point of view (safety of the water being transported in epidemic sense), the group water supply systems may be considered to be responsive to hygienic needs.

Conclusions:

1. The quality of water transported along the pipelines of group water supply systems deteriorates with increasing distance from the main installations: the content of Fe, Zn, Pb is increased, unpleasant odors begin to form, the color and bacterial contamination increases and the content of F becomes lower.
2. Water quality depends on the length of pipe line trunks, high water pressure in the system, characteristic utilization of water, and physical-chemical properties and structure of the pipe line material.
3. The decrease in F content observed with increasing distances from the main facilities is due not only to the shortcomings of the fluorination technology but also to the formation of complex compounds with Fe in water and in the corrosion sediments, as well as with the water hardness salts. Therefore, in fluoridation processes the dose of F should be determined on the basis of ionic composition of water and on the relationship among the ions.
4. To maintain optimal F content, the threshold levels of Fe and water hardness salts are: Fe - 3 to 5 mg/l, hardness salts - 7 mg-eq/l.
5. To maintain water quality and avoid its deterioration due to increased Fe levels, the length of pressure steel trunk lines should not exceed 10 km from the purification facilities to the consumer. In exceptional cases interconnected equipment should be provided for supplying the population with water in a radius of about 50 km.
6. Silication of water is an effective measure for reducing corrosive processes on the inner surfaces of the steel conduits, i.e., reduction and stabilization of Fe content in water.
7. In designing and constructing group water supply systems, one should provide for ammonium chloride treatment of water, since this is one of the more promising methods for improvement of bacteriological indicators of the quality of water, for lowering the content of Fe and improvement of organoleptic properties.

8. The role of threshold levels must be considered at the water purification installations, especially in respect to chemical poisons, surfactants and their metabolic products.

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CSO: 1870

UDC 615.478.27.014.45.074:615.285.7.025.1.074

SPECTROPHOTOMETRIC DETERMINATION OF HEXACHLOROPHENE IN AQUEOUS EXTRACTS OF ANTIMICROBIAL FABRICS¹

Moscow GIGIYENA I SANITARIYA in Russian No 5, 1979 pp 63-66

[Article by A.I. Guseva, G.A. Gaziyeu, L.V. Basova, and T.P. Klimova]

[Text] To prepare antimicrobial sleep wear and bed linen, fabrics are treated with 2,2'-dihydroxy-3,3',5,5',6,6'-hexachlorodiphenylmethane. To be able to evaluate it from the sanitation and toxicological aspects data had to be collected on its extractability with water.

There is a paucity of literature data on microanalytical methods for determination of hexachlorophene in water extracts from polymeric materials. In developing this method, we used the spectrophotometric approach to the determination of hexachlorophene in viscose fibers, soap and other cosmetic and disinfecting preparations (Johnson and Porcaro, Flear and Vacek).

Spectra of hexachlorophene in water and in aqueous alcohol solutions (1:1) were taken on "Unicam P1800" instrument using 1 and 0.2 cm quartz cuvettes. Maximum absorption of hexachlorophene solution in water and aqueous alcohol are in the 208-210 mμ wavelength. The molecular extinction coefficient at this wavelength was 2.3×10^2 in aqueous alcohol and 1.5×10^2 in water. The Beer-Lambert law was applicable in the concentration range 0-5 mg/l (water) and 0-60 mg/l (aqueous alcohol) of hexachlorophene.

When hexachlorophene reacts with copper ions in ammonia, a color complex is developed with an absorption maximum at 430-434 mμ. Maximum molecular extinction coefficient is 450. Beer-Lambert law is observed in the range of 0-560 mg/l.

From the available data it would appear that the sensitivity of direct spectrophotometric determination of hexachlorophene in aqueous alcohol is about 50 times that of a complexed hexachlorophene. But the second method is simpler as far as the instrumentation is concerned because a more commonly used equipment would be available (for example CF-4A) and because it is more selective for hexachlorophene.

1. L.N. Volkonskaya participated in the experimental part of this work.

Two fabrics were investigated: viscose jersey from a mixture of cellulose and hexachlorophene (2 samples) and a cheap cotton cloth from a grafted copolymer of cellulose and poly-1,2-dimethyl-5-vinyl pyridinium containing chemically bound hexachlorophene (A.D. Virnik et al., A.M. Gershman et al.).

Periodically the linen from antimicrobial fabrics is washed; therefore, prior to our test runs, the jersey samples were washed for 30 min in a 5 mg/l solution of "Novost" detergent at 50°C and washer module 30. The cotton sample was washed at 80°C for 30 min in a solution of special powder using washer module 5.

The water extracts of the fabrics were obtained by placing them in glass stoppered flasks, covering with distilled water and keeping them at 45±2°C for a specified period of time (V.S. Koshcheyev et al.). The ratio of fabric surface to liquid volume was 3:1 cm²/cm³.

Alcohol was added to water extracts (1:1) prior to taking the spectrum. The standard cuvette was filled with water extract of a similar fabric but containing no hexachlorophene (also the aqueous alcohol extract could be used).

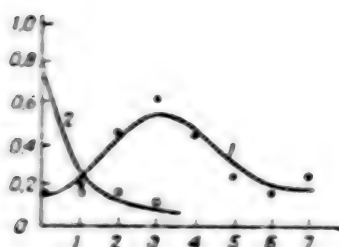
The table shows data on the hexachlorophene extracted from the fabric samples with distilled water, represented as a function of the fabric-water contact time. The content of hexachlorophene in aqueous extracts of the jersey was determined by direct spectrophotometry as described above; the results were practically identical. The hexachlorophene content in the aqueous extracts of the cotton was determined only by the copper ammonium complex test.

Quantity of hexachlorophene isolated from the antimicrobial fabrics (in mg/100 cm² of the fabric surface)

① Ткань	② Продолжительность контакта ткани с водой, сут			
	1	2	6	10
③ Трикотажное вискозное полотно (нестиранное) (образец № 1)	2.6±0.3	2.8±0.3	2.6±0.3	2.3±0.3
④ Антимикробная бязь (нестиранная)	0.16±0.04	0.20±0.04	0.16±0.04	0.16±0.04

Key:

1. Fabric
2. Duration of the fabric contact with water, days
3. Viscose jersey fabric (unwashed) (sample #1)
4. Antimicrobial cheap cotton (unwashed)



Excretion of hexachlorophene into water from the washed samples of antimicrobial fabrics

x axis - number of washings; y axis - excretion of hexachlorophene (in mg/100 cm²); 1-antimicrobial cotton; 2-antimicrobial jersey (sample No 2).

The data in the table shows that a dynamic equilibrium of the distribution of hexachlorophene between the fabric and water is almost completed in one day. The excretion of hexachlorophene into water depends on its binding to the fabric. From the viscose jersey, to which hexachlorophene is not chemically bound, it is extracted in larger quantities than from the cotton, to which it is tightly bound. The excretion of hexachlorophene from the washed fabrics is shown in the figure for the contact time of 1 day, with the ratio of fabric surface to water 3:1 cm²/cm³ and a temperature of 45±2°C. The spectra for the water and aqueous alcohol extracts of hexachlorophene from the jersey are identical, exhibiting a maximum at 208-210 mμ. The spectra of cotton extracts are not stable, they depend on its treatment and show no maximum at 208-210 mμ. Evidently the water extract of viscous jersey contains only hexachlorophene which can be quantified by means of simple spectrophotometry. In aqueous extracts of antimicrobial cotton, in addition to the hexachlorophene, other organic compounds must exist with characteristic absorption bands in the same region as that of hexachlorophene, so that direct spectrophotometric determination cannot be used. Therefore a more selective method had to be developed, based on a copper-ammonia complex (Flegr and Vacek).

Into a ground glass stoppered 100 ml conical flask, 20 ml of distilled alcohol is placed, followed by 20 ml of the water extract and 11 ml of copper-ammonia solution (10 g CuSO₄·5H₂O + 60 ml 25% ammonia solution diluted to 1 l with distilled water). The solution is filtered and its optical density is determined at 430 mμ against a standard solution, prepared from the same reagent as the test sample except that instead of water extract, distilled water is added to the alcohol. The amount of hexachlorophene in the aqueous extract is determined from a calibration curve.

The color of the solution is preserved for several days. The analytical procedure lasts only 10-15 min. The sensitivity of this procedure is 1 mg/l. Average experimental error (R.I. Alekseyev and Yu. I. Korovin) is 14% for the concentration range of 3-10 mg/l and 8% for 15-60 mg/l range. Unwashed

samples of viscose fabric release highest levels of hexachlorophene; with increased number of washes, the extraction is decreased. A different pattern is observed with cotton: maximum extraction occurs in samples washed 2-4 times. The data show that, in the process of washing, the chemical bond of hexachlorophene with the fabric is weakened, so that more of it is extracted into water in comparison to unwashed specimens.

Conclusion

1. A spectrophotometric analytical method has been developed for the determination of hexachlorophene in water extracts of antimicrobial fabrics. The minimum amount that can be determined by this method is 1 mg/l. Average accuracy is 14% in the concentration range 3-10 mg/l and 8% for the 15-60 mg/l interval.
2. It has been established that the quantity of hexachlorophene isolated from antimicrobial fabrics depends on its bonding to the fabric and on the thermo-liquid treatment (washing).
3. Extraction of hexachlorophene from unwashed samples of viscose fabrics is several fold (4-10) greater than that of the cotton.

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CSO: 1870

UDC 614.71-07-72:621.431.73

AN ATTEMPT TO USE AN AUTOMOBILE ENGINE FOR THE AIR SAMPLING IN FIELD TRIALS

Moscow GIGIYENA I SANITARIYA in Russian, No 5, 1979 pp 68-70

[Article by V.M. Popugaylo, Sverdlovsk Regional Sanitation Epidemiological Station]

[Text] The use of an automobile engine for air sampling, first proposed by V.M. Urbanskiy¹, necessitates construction of a special attachment to the carburetor, making the entire project rather complicated. From 1969 we have been using the automobile engine as an air sampling unit without any special attachment (cf. Figure). All one has to do is to disconnect the vacuum ignition corrector from the ignition distribution box, reconnecting it with the loose end of the air exhaust tube from the absorbing unit (D'yakonov or Rechmensky apparatus, adapters or other containers with solid or liquid filters). The vacuum formed in the unit induces the flow of the air from the outside, i.e. air sampling. The rubber tube should have the same diameter as the metallic tube. If necessary, one can use insulation tape, rubber tubing with different crosssections, or clamps to secure the connecting point.

The aspiration rate (normally 6-8 l/min) depends on the RPM of the engine, the volume of the sample collected, and the exposure time. To determine the aspiration rate from the engine to the adsorption apparatus, a rotameter is inserted in series. Having thus determined the aspiration rate with an idling motor and with different accelerations, the rotameter can be disconnected. It must be remembered that for each engine the aspiration rate will be different and this rate should be determined prior to moving out into the field (in case of urgent trips, using the first available car, a rotameter should be taken along). It takes only 2-3 min to prepare the engine for the aspiration job. While the driver works on the vacuum correction tube, the technician prepares the adsorption apparatus for the connecting step.

1. Gigiyena i Sanitariya, 1976, No 7

2. FROM the Editor: Considering the need for an accurate determination of the air volume passed through the adsorber, we cannot agree with the author that work can be carried out without a rotameter by estimation alone.

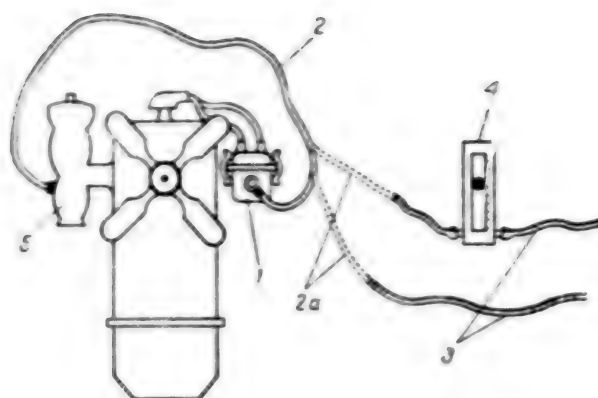


Diagram of the attachment of the filter (adsorption unit) to the automobile engine for aspirational purposes (Frontal view)

1--ignition distribution box; 2--vacuum ignition correcting tube; 2a--same tube separated from the ignition distribution box; 3--rubber tubing for the apparatus with the adsorber; 4--rotameter; 5--carburetor

If air must be collected at several widely separated points, the metallic tube may remain detached, since it does not affect the performance of the engine.

Our method makes it unnecessary to keep special equipment in each laboratory, it enables us to work without electricity, and does not require preparation of special connectors (after V.A. Urbanskiy). In addition, a mobile operation group using an automobile may collect air samples at several locations; this is very important in special study situations.

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CSO: 1870

UDC 614.7:546.48]-074

HYGIENIC EVALUATION OF CADMIUM COMPOUNDS IN THE ENVIRONMENT

Moscow GIGIYENA I SANITARIYA in Russian No 5, 1979 pp 66-69

[Article by L. Ye. Bezpalko, and L.M. Liflyand, Central Institute for the Advanced Studies of Physicians]

[Text] Cadmium is widely disseminated in the environment. Cadmium minerals do not form ore masses, but are found as secondary minerals in zinc and zinc-polymetallic ores.

Cadmium was established as one of the dangerous contaminants of the biosphere, shown by the poisoning of the Japanese population (Itai-itai disease) and populations of other countries.

The real culprits of environmental pollution along with cadmium are the zinc mining, metallurgical, electronic, semiconductor and electrotechnical industries and the production of dyes and superphosphate fertilizers (V.A. Ryazanov; and Fulkerson et al.). By far the strongest contamination of the atmosphere comes from the metallurgical processes and from galvanized plating. In the United States these two sources are responsible for more than 90 percent of all emissions of cadmium into the atmosphere (Nat. Air Poll. Control Admin. 1970). Another source of the contamination is the combustion of solid and liquid fuel. Cadmium is present in coal and in petroleum at the levels of 0.2-2.0 and 0.001-2.0 mg/kg of fuel respectively (Fulkerson et al.). Annually, up to 1000 tons of cadmium are emitted worldwide by electric plants and industrial boilers (Nat. Air Poll. Control Admin., 1970; Nat. Inventory Sources and Emissions, 1968). Processing of metal scrap and waste combustion are additional sources of cadmium pollution.

According to the data of the National Network Stations for 1972 (Environ. Agency, 1974), average annual concentration of cadmium in the nonpolluted regions of Japan was $0.02 \mu\text{g}/\text{m}^3$, while in the strongly contaminated regions, not exposed to the effects of cadmium discharge (for example Tokyo and Osaka), the levels were at 0.018 and $0.026 \mu\text{g}/\text{m}^3$ with a maximum of $0.063 \mu\text{g}/\text{m}^3$. In the United States average annual concentration of cadmium in 1979 varied from $0.06 \mu\text{g}/\text{m}^3$ (San Francisco) to $0.036 \mu\text{g}/\text{m}^3$ (St. Louis). The highest average annual concentration, that of $0.12 \mu\text{g}/\text{m}^3$, was noted in El Paso, Texas,

the site of much production of lead and zinc (Friberg et al, 1974). According to Just and Kelus, average annual concentration of cadmium in 10 Polish cities varied from 0.002 to 0.05 $\mu\text{g}/\text{m}^3$.

Much higher levels of cadmium are found around the emission sources. In Sweden, average weekly levels of 0.3 $\mu\text{g}/\text{m}^3$ are registered repeatedly 500 m away from a plant using copper and cadmium alloys. At a distance of 100 m from the source, the average monthly levels reached 0.6 $\mu\text{g}/\text{m}^3$. The highest daily concentration was 5.4 $\mu\text{g}/\text{m}^3$ (Friberg et al, 1974). In Japan, at a distance of 100 m from a zinc production plant, the average weekly concentration was 0.5 $\mu\text{g}/\text{m}^3$, and at 400 m it was 0.2 $\mu\text{g}/\text{m}^3$. In the proximity of another production site, the average values for an 8 hr collection, 500 m away from the source, ranged from 0.16 to 0.32 $\mu\text{g}/\text{m}^3$ (Friberg et al. 1971, 1974). In West Helena, Montana, average concentration during sampling 1300 m and 800 m from a metallurgical plant was 0.06 and 0.29 $\mu\text{g}/\text{m}^3$ respectively. Maximum daily concentration was 0.7 $\mu\text{g}/\text{m}^3$. An unusually high concentration, 300 $\mu\text{g}/\text{m}^3$, was noted around the production plants of lead and zinc in El Paso, Texas.

The spread of atmospheric contamination may be determined from its accumulation in moss and soil. Burkit et al found cadmium at 50 $\mu\text{g}/\text{g}$ concentrations in moss 10 km away from the source. According to Balazova et al., cadmium levels in grass around the electrical plant Novaki, Czechoslovakia were 0.11 mg/100 g, as compared to a control of 0.06 mg/100 g.

There are some reports of the contamination of surface water reservoirs and of the soil (V.A. Slobodyan, Preston et al., Yamamoto).

Average daily human consumption of cadmium is about 50 μg with variations relating to individual or regional characteristics. In the polluted regions of Japan, such as the prefectures of Miyagi and Gunma, cadmium consumption is much higher--211-245 μg per day (Japan. Assoc. of Public Health, 1970). Most of the cadmium enters the organism with food. The air intake and water ingestion in nonpolluted areas is 0.02-0.2 and 1-2 $\mu\text{g}/\text{day}$ respectively (Friberg et al., 1974). Cadmium pollution of air in the range 0.1-0.5 $\mu\text{g}/\text{m}^3$, and that of water at 10 $\mu\text{g}/\text{l}$ increases the daily intake by 2-10 and 10-20 μg respectively. Smoking is an additional source of cadmium. According to the experimental data of Szadkiewski et al, and Friberg et al (1971), one cigarette contains 1-2 μg cadmium, 10% of which could be inhaled. Smoking 20 cigarettes per day increases daily intake of cadmium by 2-4 μg .

All cadmium compounds are toxic regardless of their aggregate state and the routes of entry into the organism. The most toxic is cadmium oxide (L.P. Shabalina, 1966). Because of its high cumulative property, cadmium is one of the most dangerous toxic agents. Its excretion rate from an organism is extremely slow--about 20-30 years (Friberg et al, 1971, 1972). The highest levels of cadmium in human body were found in the liver and kidneys (G.N. Krasovskiy et al., Friberg 1957).

Most of the available epidemiologic and clinical investigations were carried out on industrial workers. The early reports of the effect of cadmium on entire population were connected with accidental consumption of nonalcoholic beverages containing high concentrations of cadmium (Fairhall). There is a report (Carroll) on a high degree of correlation between standardized indices of mortality from hypertension and atherosclerotic heart diseases and cadmium concentration in the atmosphere for 28 American cities. However, later studies (Junt et al) found no correlation between the cadmium content in the dust and mortality from cardiovascular diseases in urban areas, nor was there a correlation between cadmium concentration in milk and cardiovascular disease. An analogous study carried out in Japan among a population subjected to environmental cadmium exposure showed no connection between cadmium ingestion and hypertony or hypertonic heart disease (Tsuchiya). Medical examination of more than 50,000 inhabitants of regions contaminated with cadmium showed no difference in proteinurea incidence in these regions and in the control areas.

The data on delayed effect of cadmium and its compounds are of interest. Isolated reports indicate that it affects the reproductive functions of female workers. According to R.V. Nikitina, the frequency and the type of menstrual disorders and the increased rate of gynecological problems among the workers exposed to cadmium containing dust, are directly related to the duration of job exposure. Exposure to production levels of cadmium compounds increases the risk of prostate and respiratory tract cancer (Lemen et al). Experimental animal data showed that cadmium compounds have gonadotoxic, embryotoxic and teratogenic effect. The cumulative effect of large doses of cadmium and its compounds on the ovary has been documented (L.P. Shabalina, 1970, 1971; Kar and Das, and others). Kar et al, and Parizer et al, observed considerable hemorrhagic reaction in ovarian tissue of rats injected subcutaneously with cadmium chloride. A marked gonadotoxic effect has been determined for cadmium sulfate at a 3.0 mg/m^3 dose as well as for the dust of cadmium containing cathode luminophores at a concentration of 5 mg/m^3 . According to G.N. Krasovskiy et al, doses of 0.001 mg/kg (0.1 mg/l of drinking water) and 0.005 mg/kg (0.01 mg/l) led to functional and structural changes in the gonads.

Under experimental conditions it has been established that cadmium is capable of penetrating through the placenta from mother to the offspring (R.P. Tsvetkova; Sonawane et al.). Injection of cadmium into pregnant rats in late stages of pregnancy destroyed most of the offspring. All of the mice offspring died after gavage of cadmium with water (10 mg/l) to two generations of mothers (Schroeder and Michener). Rat offspring exposed during pregnancy to 3 mg/m^3 of cadmium sulfate showed poorer life adaptability, smaller weight and size (R.P. Tsvetkova). Teratogenic effect was noted upon administration of 5 mg/kg of cadmium in water to experimental animals (Ishizu et al). Exposure of pregnant hamsters to low doses of cadmium in early pregnancy (8 days) led to development of the following anomalies: anencephalia, cleft lip, cleft palate, microphthalmia (Mulvihill et al).

Results of animal experiments show that cadmium and its compounds produce sarcoma at the injection sites as well as interstitial cell tumors in the ovaries after single or repeated subcutaneous or intravenous injections of mice and rats (Lupis et al).

Several genetic studies were performed with somewhat contradictory results. Experiments on *Drosophila* (Ramel and Friberg) and on mice (L.K. Ramayya and M.D. Pomerantseva) showed no genetic effects, while human studies both in vitro and in the Itay-itay course showed chromosomal changes (Dernvot and Leonard).

Local contamination of the environment with cadmium prevalent in many countries, makes it necessary to regulate it. Currently Yugoslavia is the only country where a national standard has been established for the quality of air concerning cadmium: 3 ug/m^3 for a 24 hr exposure and 10 ug/m^3 for a 30 min exposure (Martin and Stern). Japan has a temporary directive for the permissible cadmium contents in air-- 0.88 ug/m^3 for 24 hr and 2.93 ug/m^3 for 30 min exposure (Ministry of Health and Welfare, Japan, 1969). In Ontario, Canada cadmium oxide levels in air have been regulated at 10 ug/m^3 for a 30 min exposure.

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UDC 616-053.2-02"614.72]-07

METHODICAL APPROACHES TO THE STUDIES OF THE EFFECT OF ATMOSPHERIC POLLUTION
ON THE HEALTH OF PRESCHOOL CHILDREN

Moscow GIGIYENA I SANITARIYA in Russian, No 5, 1979 pp 54-59

[Article by I.D. Dubinskaya, I.R. Golubev, Institute of the Hygiene of Children and Teenagers, USSR Ministry of Public Health, Moscow Institute of General and Community Hygiene Imeni A. N. Sysin, USSR Academy of Medical Sciences, Moscow]

[Text] Most of the studies carried out here as well as abroad are directed at the clarification and specification of the effects of individual factors of the environment on the health of study population, which really should not be surprising in light of the high degree of differentiation of public hygiene. Our studies have been based on the so called "method of differences" which states that if life conditions differ by some degree in their expression, then the differences found in the health of the population should be related to them. This approach is undoubtedly correct, however, most of the time the investigators confine themselves to establishment of the differences in the expression of a factor in which they are interested without proper attention to other environmental characteristics of the conditions under which a given population has to live. Whenever quantitative expressions of the health status are required, it is not sufficient to illustrate that "where the environment is poor--there the public health is also in poor state", one must report precisely the effects of each factor in the environment on the study population in concrete terms.

With this as a starting point, we attempted to develop and improve the methodology for studying the effect of atmospheric pollution on the health of population as one of the factors of the environment.

Under the term "methodical approaches" we mean the following: selection of study population, description of their health status and treatment of the data obtained.

Normally the effect of atmospheric pollution has been studied in children's collectives since most of their time is spent in institutions where air quality and other environmental factors could easily be determined; the

children are not easily susceptible to respiratory tract diseases and the respiratory system is the first to react to air pollution; the children have not yet been exposed to professional hazards and they do not smoke.

The most rational selection method of the study population is the typologic selection based on the model: copy-pair. The basic principle of this model is the selection of a control individual resembling closely each experimental individual. In other words, both groups consist of subjects differing only by the effect of atmospheric pollution, so that its effect can be evaluated and the most informative indices of the health status for various population groups can be selected.

The data obtained is treated by traditional statistical methods (calculation of alternate indices, analysis of the series of variation, etc). Quantitative characteristics of the studied phenomena may be obtained with sufficient number of study groups (at least 3), balanced by proper selection based on the model copy-pair, and by construction of nomograms for the establishment of rules.

To determine the health status in children's collectives it is necessary to evaluate each individual. It is important to diagnose a disease when applicable and to determine social competence of a child, i.e. "its ability to learn and perform" which, according to V.P. Kaznacheyev determines the "health". It is in this sense that the concept "health" must be used: not only absence of disease and injuries but also "a state of complete physical, emotional and social well-being".

Starting from such a concept, it is improper to equate "health" simply with the presence or absence of disease; a much more precise qualitative and quantitative description is needed. Therefore, when evaluating the health status, at least four criteria must be used (S.M. Grombakh, G.N. Serdyukovskaya): presence or absence of chronic diseases (prolonged ones), functional state of principal organs and systems responsible for homeostasis (cardio-vascular, blood system, nervous, humoral, respiratory systems etc), the degree of organic resistance determined by frequency and type of past and present illnesses in a given period and by the general immune reactivity, and the level of physical and psychological development and harmony between them.

To determine the first criterion, somatic examination is performed by a number of specialists: pediatrician, otolaryngologist, psychoneurologist, stomatologist, orthopedic surgeon, etc. The diagnosis is established on the basis of carefully developed clinical history and additional necessary studies.

The second criterion of health status, an important determinant of the effect of environmental factors, should now be addressed. Occasionally no illness can be diagnosed in a child except for some functional limitations (lower hemoglobin, temporary disturbance of hemodynamics, etc) of the physiological potential of the organism. Such indications become extremely important in evaluating the comparative health state of a single child or on

occasions even of the entire collectives, when different periods and living conditions are evaluated.

Of special importance in evaluating the health status is the third criterion--it is an integral function determining the resistance of an organism to adverse effects, which in final analysis shows up as a submission to the disease, i.e. the number of illnesses suffered in a given period. A number of tests has been selected for the determination of the reactivity of an organism, depending on individual applicability and adequacy.

The fourth criterion is determined on the basis of physical development, evaluation of weight and height gain, rate of morphologic development and maturity, results of psychoneurological tests, detailed interviews with parents and teachers as well as on the observation of the children under different conditions, including their performance of various tests.

Determination of each of these criteria alone does not give a complete picture of the health status of an individual child or of the collective; a complex evaluation of the health state is required.

After many years of research, the Institute of Hygiene of the Children and Teenagers, USSR Ministry of Public Health, came out with a classification scheme for children based on their health. The first group includes healthy children with normal development and normal basic functions; the second includes healthy children with some functional or morphological abnormalities, subject to frequent diseases; the third group includes children with chronic diseases (tonsillitis, rheumatism, pyelonephritis, cholecystitis, etc) in the state of compensation and preservation of their functional ability; the fourth group includes children with chronic disease in a subcompensation state with diminished functional ability but without marked effect on their general condition; the fifth group--children with chronic diseases, state of decompensation, who at the time of examination are either bedridden at home or actually hospitalized. The advantage of this classification is that when a health group is assigned to individuals, a complex health picture is produced with consideration of all criteria, in contrast to the methods which commonly determine the health status by individual indicators (disease rate, spread of individual ailments, physical development) presenting disjointed reports on each health aspect separately, without considering their synergism.

Even though they produce a certain data bank, single evaluations of the state of health in a given group of children, even with proper controls cannot cover all the variables, and cannot point out all the factors which affect children along with the variable being investigated, capturing the child at one single moment of his life, without considering the dynamics of its development. Therefore the longitudinal or semilongitudinal method should be preferred, since it makes possible the study of the development of these indicators and of the external factors together with their interaction.

In an attempt to improve the methodical approaches along the directions shown above, the Institute of the Hygiene of Children and Teenagers, USSR Ministry of Public Health and the Institute of General and Community Hygiene named A.N. Sysin, Academy of Medical Sciences USSR combined their efforts in a complex, longitudinal study of the health status of preschool children living in regions with different quality of air.

About 1000 children were entered in the study, living and attending preschool institutions in regions with different levels of air pollution. These institutions were located in identical buildings which were satisfactory, the daily schedule and the curriculum satisfied the hygienic recommendations and program requirements.

We studied the following: biological indicators—parents' age and health, consecutive pregnancy and birth of the child studied, sex and age of the child, ante-, peri- and early postnatal ontogenesis; social indicators—living conditions, material security, education of parents, medical attention; physical indicators—climatic conditions, microclimate, etc. Only the chemical indicators were kept different, mainly the level of atmospheric pollution and the contamination of air in the facilities housing the children.

The atmospheric air of the investigated regions ("basic") was being contaminated by power plants, ferrous and nonferrous metallurgy and by construction and chemical industry. The degree of pollution was estimated from individual indicators and in combination with the hazard class and the duration of the exposure to specific levels of pollutants. Several averaging methods of single concentrations were used (on the daily, weekly and yearly basis). During the entire observation period the average concentration ($M \pm \sigma$) of nitrogen oxide was $0.123 \pm 0.06 \text{ mg/m}^3$, sulfur dioxide - $0.134 \pm 0.04 \text{ mg/m}^3$, ammonia - $0.014 \pm 0.003 \text{ mg/m}^3$, carbon monoxide - $1.9 \pm 1.0 \text{ mg/m}^3$ and dust - $1.1 \pm 0.4 \text{ mg/m}^3$.

The health status was evaluated by the four criteria for health determination.

Analysis of the health status showed marked differences in the regions with different degree of atmospheric air pollution.

The overall disease rate (obtained from treatment statistics) calculated by abstracting dispensary charts (Form #112) was higher in the more contaminated regions. The number of treatments in these regions was higher from the control areas (taken for 100%) by 52% in the first year of life, by 49% in the second year, by 28% during the years 3, 4, and 5 and by 53% in the sixth year of life.

The frequency of respiratory diseases was 1.5-1.8 fold higher. The subjects were affected principally with acute respiratory problems and influenza, and the 1-2 year old children manifested higher rates of pneumonia.

In comparison to controls, the number of acute infectious diseases among the children of the polluted areas was 1.5-2 fold higher, while the problems of

the nervous system and of the hearing organs (principally acute and aggravated chronic otitis) were 2 fold higher. The excess was 118% during the first year of life, 200% in the 2nd and 5th years and 228% in the sixth year.

The health index (the number of patients per each year of life per 100 examined cases) was 3 times lower among the one year old children and 2 times lower in other groups; the number of frequently ailing children (4 times and more per year) was higher (Table 1).

Specific differences were observed in several functional systems both by average data and by individual distributions, especially among the younger children (2-3 years old), the children from the contaminated areas showed higher index of: respiratory rate, heart beat, arterial pressure, number of blood erythrocytes etc., than the children from control regions; furthermore, there were more children with increased SOE than in the control areas coupled with cases of moderate erythrocytosis, moderate or marked tachycardia, moderate hypertonic reaction, etc.

Table 1

Distribution of children by the frequency of sickness (per 100 children)

(1) Год жизни	(2) В загрязненных районах			(3) В контрольных районах		
	(4) не болевшие	(5) эпизодически болевшие	(6) часто болевшие	(7) не болевшие	(8) эпизодически болевшие	(9) часто болевшие
1-й	6,47	50,43	43,10	20,80	57,60	21,60
2-й	5,60	39,23	55,17	12,40	54,40	33,20
3-й	5,56	41,20	53,24	13,20	50,00	36,80
4-й	6,28	53,81	39,91	11,06	52,77	36,17
5-й	7,43	50,68	41,89	13,15	59,15	27,70
6-й	13,33	51,43	35,24	20,15	59,76	20,12

Key:

- | | |
|----------------------|----------------------|
| 1. ge | 6. Frequently sick |
| 2. Polluted region | 7. Healthy |
| 3. Control region | 8. Occasionally sick |
| 4. Healthy | 9. Frequently sick |
| 5. Occasionally sick | |

The results of a functional load test (step test) also showed a low level of performance capability (PWC_{170})¹ among children from polluted areas in comparison to controls ($M_1=242.8$, $M_2=304.3$).

1. PWC_{170} in kg-m per min according to V.L. Karpman et al.

Table 2

Distribution of Children by Health Groups (% of the Total)

(1) Группа здоровья	(2) Май 1975 г. (подготови- тельная группа)		(3) Октябрь 1975 г. (1-й класс)		(4) Май 1976 г. (1-й класс)	
	(5) в загрязнен- ных районах	(6) в контроль- ных районах	(7) в загрязнен- ных районах	(8) в контроль- ных районах	(9) в загрязнен- ных районах	(10) в контроль- ных районах
1-я	31.25	62.5	20.5	51.73	15.62	46.88
2-я	43.75	25.0	55.88	31.03	53.12	34.37
3-я	18.75	4.17	23.52	17.24	18.76	18.75
4-я	6.25	8.33	—	—	12.5	—

Key:

- | | |
|----------------------------|----------------------|
| 1. Health group | 6. In control areas |
| 2. May 75; preschool group | 7. In polluted areas |
| 3. Oct 75; 1st class | 8. In control areas |
| 4. May 76; 1st class | 9. In polluted areas |
| 5. In polluted areas | 10. In control areas |

Changes were noted in general immune reactivity: low lysozyme activity in saliva ($M_1 = 64.8$, $M_2 = 109.9$)², elevated chemiluminescence in blood ($M_1 = 30.6$, $M_2 = 17.4$)³, lower activity of blood cell myeloperoxidase ($M_1 = 223.0$, $M_2 = 237.0$)⁴. It should be noted that these differences were found not only among the average values, but also in the distribution of individual indices. In the polluted regions the number 6-year old children with low blood cell myeloperoxidase activity was 11.8%, in the control area--3.8%, among the 7-year old ones 27.0 and 5.7% respectively; low level of butyryl cholinesterase in the same age groups was 33.0 and 14.0%, high level was 16.0 and 27%⁵.

The physical development level showed no marked differences, while the psychological-nervous state was poorer among the children of polluted areas (in all age groups there were twice as many children with abnormalities).

All these data show lower resistance among the children living under conditions of atmospheric pollution; this could also be responsible for more frequent chronic diseases as well as poor health status in general. For

2. Determined in micrograms by G.L. Turovets according to B.A. Frolov

3. Total luminescence calculated in relative units according to Yu. A/ Vladimirov et al.

4. Determined by G.N. Laurukhina, according to the procedure of Graham-Knoll as modified by Lilli

5. Determined by M.S. Osipova by the method of S.S. Zubkova, T.B. Pravdich-Nemchinska as modified by E. Sh. Matlina and V.N. Prikhozhan

example, in the polluted regions there were twice as many pre-kindergarten children in the 3rd and 4th health group, more children in the 2nd group and fewer in the 1st than in control areas (cf. Table 2). Furthermore, after summer vacations, at the beginning of a school year, in spite of the overall improvement of the health status (there were no children in the 4th group), the differences between the study and control groups were still maintained and by the end of the first school year they became even more pronounced.

At this time the data is further analyzed in an attempt to find relationships between the health status and the level of atmospheric pollution and to assess the informative power of individual indices on the functional state of the entire organism.

Obviously, the use of any new nonspecific indicator for the evaluation of children's health status may be justified only when the information it provides is higher than that of other tests.

Our preliminary data show that there is a definite relationship between the individual indicators of the functional state of an organism and the health status in general (health group). For example among the pre-school children of the 1st group, an adequate level of general immunological reactivity (according to V.I. Joffe) was shown by 81.0% of the children, while a poor level was found in 10.0%; at the same time the children of the 3rd and 4th groups exhibited 31.0% good and 43.0% poor level of immunological reactivity. It was also shown that the correlation coefficient relating the intensity of blood serum luminescence and the health groups was 0.41 ($t = 3.5$); The relationships among other indices studied (SOE, FSOE, cardiovascular function, bactericidal skin capacity) and the health status was insignificant (i.D. Dubinskaya, G.L. Turovets).

Thus, these studies have shown that the proposed determination of health levels and the complex evaluation of the health status (by specified groups) are acceptable tools for the evaluation of the effect of atmospheric pollution on the organism in general.

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UDC 615.471:614.71/.73-07

AUTOMATIC MULTICHANNEL AIR SAMPLING APPARATUS

Moscow GIGIYENA I SANITARIYA in Russian No 5, 1979 pp 61-63

[Article by P.I. Bresler, N. Sh. Vol'Berg, G.A. Garanin, et al., All-Union Scientific Research and Construction Institute of Scientific Instruments, Leningrad]

[Text] Most of the gaseous atmospheric pollutants are analyzed with standard chemical methods. Considering the complexity and high cost of gas analyzers and the difficulty in operating them, it is quite possible that chemical analysis of atmospheric pollutants will continue to be important even in the future.

The biggest problems in chemical analysis are connected with air sampling, which involves passing specified air volumes at predetermined delivery rate which depends on the sensitivity of the method, through containers filled with chemical absorbers for individual components. In case of bulk manual sampling, considerable effort is lost, and evening as well as night-time collections are very difficult. Finally, it is virtually impossible to control the subjective error of the operator employed in manual collection; this error may reach quite high levels (B. I. Ryabtsev)

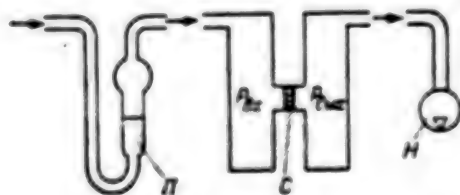


Fig. 1. Diagram for the stabilization of the delivery η - adsorption device; C- constriction unit; H- vacuum pump

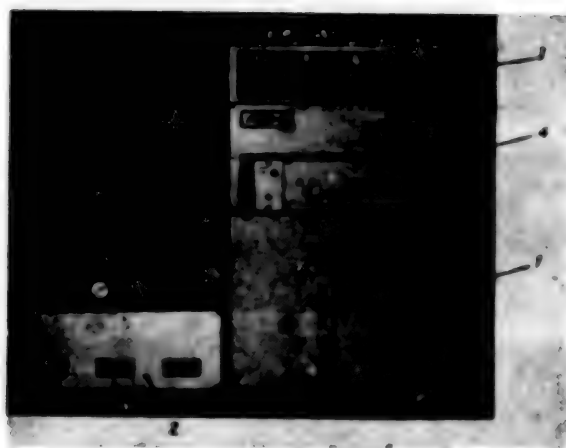


Fig. 2. Automatic multichannel apparatus for air sampling. Explanation in text.

The described apparatus is designed for automatic air sampling in a cyclic regimen (the collection time may vary from 5 to 30 min). At the end of one cycle the operator removes the adsorbents with collected specimens, selects another cycle and starts the machine. All other operations are done automatically. The equipment is capable of maintaining selected rates of air passage through the adsorbents and automatically time the sampling operation. The rates of air passage are maintained by means of critical flow of the air through an aperture nozzle in which the pressure at the exit is less than half the pressure at the entrance, i.e., $P_{ex} < P_{ent}$ (Fig. 1). Furthermore, the air passage through the aperture depends on the cross-section of the opening and not on the pump performance.

Currently, the sanitation-epidemiologic stations and the hydrometeorological service network have begun to use electric aspirators with a built in delivery meter EA-1¹ and a programmable sampler "Aeromat" from Hungary, whose characteristics, together with those of the newly developed multichannel sampling apparatus, are reported in the Table 1.

The sampling apparatus described (Fig 2) consists of a stand (1) and a separately housed compressor (2), interconnected with a power cable and a rubber hose air passage. The following units are located inside the stand:

1. Electroaspirator with built in delivery meter. Passport Mb 2.840.007 PS, SKTB-SP., Klin, 1976
2. Programmable emission air sampler "Aeromat", Type ON-601, Company "Radelkis", Budapest, 1974

Technical Characteristics of Air Sampling Equipment

Technical Characteristics	Automatic apparatus for air sampling	Electroaspirator with built-in delivery meter EA-1	Programmable Sampler "Aeromat" ON-601
Number of channels (collecting at the same time)	4	4	4
Work regimen:			
manual	+	+	+
automatic	+	-	+
average automatic for one adsorber in each channel	+	-	+
Delivery settings, dm ³ /min:			
automatic operation	0.25;0.5;1;2;3;4;6	-	1;5
manual operation	0.25;0.5;1;2;3;4;6	0.25-5.0	0.21-2.1
Total delivery by channels dm ³ /min	8	10	1.5*
Air sampling duration, min	5-30	2-60	60
Duration of each cycle, hrs	5-30	-	1-24
Number of samples collected in a cycle by each channel	Up to 8	-	Up to 8
Reproducibility, %	<u>+1</u>	<u>+10**</u>	<u>+1</u>
Dimensions in mm (without pump)	585X1060X470	750X410X340	500X250X450
Weight (without the pump) kg	70	25	28

*This value is for the automatic mode of operation

**Depends on the attention and devotion of the operator maintaining the delivery manually, based on the rotometer readings

relay block thermoregulator, thermostat, electrocontact vacuum meter, filters, and accessory parts. On its top are attached the block for the electro-pneumatic valves and a block for the absorbers (3). The time relay, which controls the duration of an operation, is located on the bottom of the stand. Principal controls for the APV-1 apparatus are located on the face panel of block (4). The socket, the pump joint, the power cable connector, and the internal coupling joint are on the bottom of the back panel.

The results of laboratory tests and the data reported in the table show that the operational error of the automatic multichannel air sampling apparatus is much lower than that of manual collection. High capacity, small error and operator free performance for prolonged periods make it possible to use this apparatus for massive chemical analyses of air pollution as well as for research purposes.

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Ryabtsev, B.I., GIGIYENA I SANITARIYA, 1977, No 4, pp 58-60

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BRIEFS

SALUBRIOUS WATERS--Numerous mineral springs and mud baths, suitable for therapeutic use, have been discovered in the western reaches of BAM (Baikal-Amur Railway). One of them is a mineral spring with waters that are chemically similar to the Truskavtsi [Western Ukraine] water "Naftusya". This spring is located on the right bank of the river Kirenga, not far from Ul'kan station. Here on the surface are to be found radon waters as well as potable mineral waters. In all, on the territory of the Priбайkal'ye and Northern Zabaykal'ye 17 types of waters have been discovered. [Text] [Moscow MEDITSINSKAYA GAZETA in Russian 21 Mar 1979 p 4] 12172

CLEAN-AIR STUDY--A two-year study has commenced on multifaceted evaluation of air pollution in Moscow and in the Moscow region. Workers of more than forty academic and industrial institutions are participating in this search for clean air. The technical arsenal of this experiment includes tens of laboratories on the ground and specially equipped helicopters and airplanes. [Text] [Moscow MEDITSINSKAYA GAZETA in Russian 21 Mar 79 p 1] 12172

CLEAN AIR CONTROL--Sverdlovsk (Our Correspondent--Recently a dark-green "UAZik" [Expansion unknown] has appeared on our city streets with a sign on the side stating: Clean Air Control. This is a mobile laboratory--"Atmosfera-2". It contains meteorologic equipment to monitor wind velocity, air quality, and humidity, as well as to collect other information. In addition, some noxious substances in the air are also detected. On the basis of this information a monthly bulletin is issued which contains information on the air quality in Sverdlovsk and Nizhniy Tagil. [Text] [Moscow MEDITSINSKAYA GAZETA in Russian 21 Mar 79 p 2] 12172

NATURE PROTECTION---(Blagoveschensk. (Our Correspondent)--A scientific and industrial conference was held here on nature protection in the central area of BAM (Baikal-Amur Railway). The participants included representatives of the sanitary services of BAM, constructional organizations, laboratory establishments of the Far Eastern Scientific Center of the Academy of Sciences USSR, and scientists from pedagogical and agricultural institutes. The conference developed recommendations for nature protection along the railway. [Text] [Moscow MEDITSINSKAYA GAZETA in Russian 21 Mar 79 p 3] 12172

SURGERY

OPERATING WITH ULTRASOUND

Moscow IZVESTIYA in Russian 19 May 79 p 3

[Article by N. Maksimov]

[Text] The name of Professor Mikhail Aleksandrov Pen'kov of the Khar'kov Medical Institute is well known in the Ukraine. He has returned sight, the ability to work and to feel the joy of sensing the environment once again to thousands of people.

In the past few years, scientists in our country have begun to use a new method of removing certain types of cataracts--by breaking the clouded lens into fine particles with ultrasound and removing them from the eye. With this method of treatment, the patient is bedridden for a total of several hours after surgery and is discharged from the clinic and is treated in an ambulatory setting for 2-3 days. The device which has been named the "UZOR-1" was developed by Professor M.A. Pen'kov, doctor of medical sciences and chief of the Department of Eye Disease at the Khar'kov Medical Institute in cooperation with U.V. Akhtyrskiy, a candidate in technical sciences and a designer at the Khar'kov plant imeni T.G. Shevchenko. The "UZOR-1" has successfully undergone testing in the nation's eye clinics. At present, the plant imeni T.G. Shevchenko has begun to manufacture the first trial batch of these units.



In the photograph: Professor M. A. Pen'kov, Doctor of Medical Sciences prepares the "UZOR-1" unit for the next operation.

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SCIENTISTS AND SCIENTIFIC ORGANIZATIONS

FROM THE COMMITTEE ON THE LENIN PRIZE AND THE USSR STATE PRIZE IN THE AREA OF SCIENCE AND TECHNOLOGY AT THE USSR COUNCIL OF MINISTERS

Moscow IZVESTIYA in Russian 17 May 79 p 3

/Text/ The Committee on the Lenin Prize and the USSR State Prize in the area of science and technology at the USSR Council of Ministers reports the following candidates for USSR State Prizes 1979.

1. Vald'ner, O.A., Voronkov, R.M., Grishayev, I.A., Zolinova, L.G., Sobenin, N.P., Nikolayev, V.M., Prudnikov, I.A., Smirnov, V.L., Khizhnyak, N.A., Shikov, V.Ya. "Development, Creation and Introduction into Operation of Linear Accelerators of Electrons" (series of studies), presented by the Scientific Research Institute of Electrophysical Apparatus imeni D.V. Yefremov.

2. Bryukhnovich, G.I., Butslov, M.M., Drozhbin, Yu.A., Zavoytskiy, Ye.K., Korobkin, V.V., Nesterikhin, Yu.Ye., Pergament, M.I., Stepanov, B.M., Fanchenko, S.D., Chikin, R.V., Shchelev, M.Ya. "Principles and Experimental Realization of Subnanosecond Electron-optical Registration of Processes in Physical Studies", presented by the Institute of Atomic Energy imeni I.V. Kurchatov, the USSR Academy of Sciences Physical Institute imeni P.N. Lebedev and the All-Union Scientific Research Institute of Optical Physical Measurements.

3. Budker, G.I., Skrinitskiy, A.N., Dikanskiy, N.S., Meshkov, I.N., Parkhomchuk, V.V., Salimov, R.A., Derbenev, Ya.S., Pestrikov, D.V., Sukhina B.N. "A Method of Electron Cooling of Beams of Heavy Charged Particles" (series of studies), presented by the USSR Academy of Sciences Institute of Nuclear Physics (Siberian Section).

4. Vinogradov, Ye.A., Gershenzon, Ye.M., Gershteyn, L.I., Golant, M.B., Irisova, N.A., Kozlov, G.V., Krupnov, A.F., Meriakov, V.V., Negirov, A.A., Prokhorov, A.M., Savel'yev, V.S. "Development and Use of the New Technique and Methods of Submillimeter Spectroscopy", presented by the USSR Academy of Sciences Physical Institute imeni P.N. Lebedev and the USSR Academy of Sciences Institute of Applied Physics.

5. Zuyev, V.Ye., Zakharov, V.M., Ivanov, A.P., Kabanov, M.V., Kozintsev, V.I., Kostko, O.K., Rozenberg, G.V., Samokhvalov, I.V., Ushakov, G.V. "Development of Physical Principles and Methods of Laser Probing of an Aerosol in the Atmosphere", presented by the USSR Academy of Sciences (Siberian Section) Institute of Optics of the Atmosphere.
6. Frank, I.M., Antonov, A.V., Bergman, A.A., Granatkin, B.V., Isakov, A.I., Kazarnovskiy, M.V., Lazareva, L.Ye., Popov, Yu.P., Stepanov, A.V., Feynberg, Ye.L., Shapiro, F.L., Shtrankikh, I.V. "Proposal, Development and Introduction into Practice of a Physical Experiment of Fundamentally New Methods of Measuring Neutron Cross Sections and Diffusion Parameters on the Basis of Unsteady Transfer of Neutrons" (series of studies), presented by the USSR Academy of Sciences Physical Institute imeni P.N. Lebedev and the USSR Academy of Sciences Institute of Nuclear Studies.
7. Beletskiy, V.V., Grodzovskiy, G.L., Ivanov, Yu.N., Ivashkin, V.V., Il'yin, V.A., Kuzmak, G.Ye., Tokarev, V.V. "Problems of Optimization in the Mechanics of Space Flight" (series of studies), presented by the Institute of Problems of Control (Automatics and Telemechanics) and the Central Aerodynamics Institute imeni Professor N.Ye. Zhukovskiy.
8. Borovkov, A.A., Sazonov, V.V., Statulovichus, V.A. "A Series of Studies on Asymptotic Methods of the Theory of Relativity", presented by the USSR Academy of Sciences Institute of Mathematics imeni V.A. Steklov.
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Titles of studies and authors collectives (except #54) are published according to the representation without change.

In publishing these 67 studies and 11 textbooks in the competition, the Committee appeals to heads of scientific and scientific and technical societies, scientific institutes enterprises and colleges to discuss the studies and the authors' collectives.

Any comments should be sent to the Committee Secretariat before 1 September, Address 125047, Moscow, 3d Tverskaya-Yamskay Street, No. 46, Telephones: 250-37-14, 250-38-08, 250-19-47.

2791

CSO: 1870

SCIENTISTS AND SCIENTIFIC ORGANIZATIONS

FROM PRESIDIUMS OF THE COMMITTEE ON THE LENIN PRIZES AND USSR STATE PRIZES
IN THE AREA OF SCIENCE AND TECHNOLOGY AT THE USSR COUNCIL OF MINISTERS AND
THE ALL-UNION CENTRAL COMMITTEE OF TRADE UNIONS

Moscow IZVESTIYA in Russian 17 May 79 pp 3-4

/Text/ The Presidium of the Committee on the Lenin Prize and the USSR State Prize in the Area of Science and Technology at the USSR Council of Ministers and the All-Union Central Council of Trade Unions report the following candidates (leaders in All-Union Socialist Competition) for USSR State Prizes 1979:

1. Mashchenko, M.P., Kurochkin, A.V., Sabirzyanov, A.G., Bakulina, Z.V., Veremeyenko, V.V., Pobuzhayev, Ye.M., Lopayev, I.P., Tsalko, B.M., Chuchkalova, F.A., Strizhak, V.P., Zaytsev, V.A., Kononov, V.G., "For Outstanding Achievements in Labor, High Efficiency and Quality of Work in the Area of Power Engineering and Heavy Machine Construction Based on Creative Collaboration of Sub-contractors," presented by the Central Committee of the Trade Union of Power Plant and Electrical Engineering Industry Workers, the Central Committee of the Trade Union of Heavy Machine Construction Workers, the Ministry of Heavy and Transportation Machine Construction, the Ministry of the Electrical-Engineering Industry, the USSR Ministry of Power Engineering and Electrification.
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Send any comments to the Secretariat of the Committee before 1 September 1979 to 125047, Moscow, 3d Tverskaya-Yanskay Street, Apartment No 46, Telephones: 250-38-08; 250-19-47; 250-37-14

2791

CSO: 1870

SCIENTISTS AND SCIENTIFIC ORGANIZATIONS

NEW MEMBERS OF THE USSR ACADEMY OF SCIENCES

Moscow MEDITSINSKAYA GAZETA in Russian 21 Mar 79 p 1

[Text] At the general meeting of the Academy of Sciences USSR on 15 March 1979 elections were conducted on full and corresponding members of the USSR Academy of Sciences, in accordance with its statutes. Among those elected were medical scientists. In the physiology department full membership in the USSR Academy of Sciences was accorded to Academicians of the Academy of Medical Sciences USSR N.N. Blockhin and Ye. I. Chazov, and corresponding membership to S.N. Yefuni.



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Photograph, left to right: Academicians of the Academy of Sciences USSR Nikolay Nikolayevich Blokhin and Yevgeniy Ivanovich Chazov, and Corresponding Member Sergey Naumovich Yefuni.

SCIENTISTS AND SCIENTIFIC ORGANIZATIONS

AGROTECHNOLOGY OF COTTON-GROWING IN UZBEKISTAN

Tashkent SEL'SKAYA PRAVDA in Russian 15 Apr 79 p 4

[Article by S. Kh. Sirazhdinov, vice president of the UzSSR Academy of Sciences: "The Moving Force of Progress"]

[Text] The Presidium of the SSR Supreme Soviet has established by ukase an annual holiday, "Soviet Science Day". This is yet another clear indication of the support of our party and government for Soviet science.

More than 1,300 thousand workers are employed in the field of science. At the present time scientific research institutions and higher educational institutions in our republic number nearly 200. More than 32,000 scientific workers are employed in them, including 13,000 doctors and candidates of science. The largest associations of scientists are the republican academy of science comprising 33 scientific institutions and the Central Asia division of the VASKhNIL [All-Union Academy of Agricultural Sciences imeni Lenin].

The scientific research medical institutions are in the Ministry of Health of the republic; the higher educational institutions are in the Ministry of Higher Education and the Ministry of Education. Scientific research on branches of the national economy and culture is being conducted by the many branch institutes. The scientists of Uzbekistan are engaged in almost all fields of natural and social science. They are making an outstanding contribution to the scientific and technical development of our republic's agriculture. Cotton is the chief wealth of Uzbekistan. Thanks to the creation by scientists of wilt-resistant "Tashkent" varieties on a completely new scientific basis, the republic has received more than five million tons of "white gold" in five years. After this year heavy-producing Variety AN-402, which has higher than usual natural defoliation, will be regionalized. Fine-fibered varieties of cotton plants have been created for traditional and more northerly regions of cultivation, making an increase in cotton production possible already this year.

Selectionists of the Academy of Sciences, the Institute of Cotton-plant Selection and Seed Growing and (SoyuzNIKHI) have created still more promising varieties of cotton-plants which ensure fulfillment of the plans envisaged by the 25th CPSU Congress and the 19th Congress of the Communist Party Uzbekistan on cotton-growing.

It is necessary not only to have a good variety but also to know how to preserve and secure the harvest grown from pests and diseases. The recommendations of scientists of the Academy of Sciences, VASKhNIL and Samarkand University on the use of biological methods of agricultural pest control, herbicides and antiwilt preparations and progressive agrotechnological methods make it possible to obtain large harvests. The effectiveness of fertilizers and the validity of their use play a major role in increasing yield. Compound fertilizers containing microelements have been created by the academies; they will be applied taking the agrochemical soil maps into account. A great contribution to environmental protection has been made by the chemists of the academy, who created nontoxic defoliant, particularly UDM, which was tested on large territories in 1978. The Institute of Irrigation and Mechanization of Agriculture has also created an effective defoliant, "TIIMSKh Alfa". In collaboration with the design organizations and the "Tashsel'mash" Plant, the academy improved a system of cotton-harvesting machine spindles, increasing their productivity by 15-20 percent, and the VASKhNIL has created an effective system of machines for cotton-growing.

It is well known that the cotton plant is a moisture- and heat-loving crop. In order to further increase cotton production, additional sources of water are needed; these are already scarce. In Uzbekistan regions new to cotton-growing are being put into cultivation--the Dzhizakskaya and Karshinskaya Steppes, the Sherabadskaya Valley and other areas. Both Kazakhstan and the other republics of Central Asia need water.

The question of transferring water from the northern regions of our country is now being worked on. At the present time a decision has been made about transferring part of the waters of the Siberian and northern rivers to Central Asia and Kazakhstan. The first phase is to involve 10, and the second, 24 billion cubic meters of water per year. This is not a problem for cotton-growing alone; it encompasses the solution of urgent problems in the development of all branches of agriculture, industry and specialized employment of the republic's growing population.

Many of the scientific research and design institutions of the republic and the Union have begun working on the water problem. And at present the scientists are working out economical systems of water consumption: machine and drip irrigation and irrigation using tubes. There is reason to think that they will make it possible to overcome successfully the difficulties which we will experience until the Siberia-Kazakhstan-Central Asia canal is built.

Speaking of agriculture, something must be said about the scientists' research on developing livestock raising. The Institutes of Livestock Raising and Karakul Sheep Raising have produced a number of valuable, highly productive strains of cattle and sheep. Effective methods for increasing fodder production using the resources of enormous territories of

arid, semiarid, mountainous and piedmont zones in order to increase the fodder base have been developed and put into practice. A wide variety of fodder plants has been selected for these zones; agrotechnological methods have been developed for their cultivation. Good results have been obtained by the Institute of Microbiology of the Academy of Sciences and by the Institute of Veterinary Medicine of the VASKhNIL which have shown the feasibility of using cotton stems, bolls and leaves as full-fledged fodder. This year a special method of ensilage of cotton bolls and stems will be tested in a number of oblasts.

Modern scientific research on molecular biology, bioorganic chemistry and biochemistry have made it possible to penetrate the most complex processes occurring in living organisms. The research of the scientists of Uzbekistan in this field of science will assuredly appear in the international arena. The international symposium on bio-organic chemistry and molecular biology, which took place in Tashkent last year and in which many Lenin, State and Nobel Prize winners participated, gave a high evaluation of science in Uzbekistan and the conditions which our scientists have created for fruitful work.

The international symposium on macromolecular chemistry, the Japanese-Soviet symposium on probability theory and many other international measures devoted to problems of cybernetics, physics and other sciences received the same evaluation.

Recently the research of the scientists of Uzbekistan has been increasingly attracting attention in the Soviet Union and abroad. Joint research with scientific organizations of the capitalist, developing and socialist countries is being organized. The scientists of Uzbekistan are going abroad for consultations and joint research in multi- and bilateral programs and are conducting research with scientists of the USA, Poland, the GDR, Mongolia, Bulgaria, Czechoslovakia and other countries.

The high recognition of the services of Soviet science imposes on us still greater responsibility for fulfilling the grand plans for the construction of communism. It can be said with assurance that this honorable task will be successfully realized by the scientists.

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SCIENTISTS AND SCIENTIFIC ORGANIZATIONS

UDC 615.838:929 Olefirenko

VALENTINA TARASOVNA OLEFIRENKO

Moscow VOPROSY KURORTOLOGII FIZIOTERAPII I LECHEBNOY FIZICHESKOY KUL'TURY in Russian No 2, 1979 pp 74-75

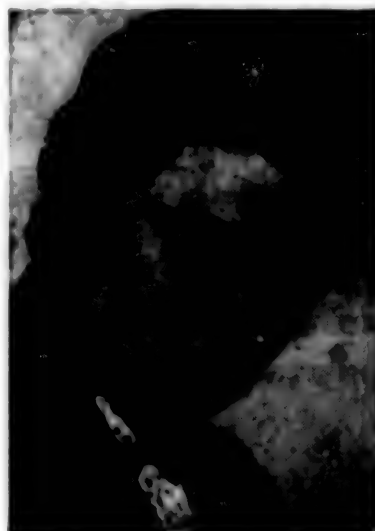
[Article by Council of Scientific Medical Societies of the USSR Ministry of Health; Administration of the All-Union, All-Russian and Moscow Urban Societies of Physical Therapists and Health Resort Specialists; Problem Commission of the USSR Academy of Medical Sciences on Health Resort Care and Physical Therapy; Central Council on Control of Prof-soyuz Health Resorts; and Editorial Board of the journal VOPROSY KURORTOLOGII, FIZIOTERAPII I LECHEBNOY FIZICHESKOY KUL'TURY commemorating V. T. Olefirenko's 60th birthday]

[Text] Professor Valentina Tarasovna Olefirenko, great Soviet balneologist, doctor of medical sciences celebrated her 60th birthday and 36 years of medical, scientific and pedagogic and social activities.

V. T. Olefirenko was born in January, 1919. She began her labor activity at age 15, continuing to study in an evening school for working youth.

In 1942, in burning Stalingrad, she completed the medical course and was sent to an evacuation hospital, working to complete assignments of evacuation of wounded from Stalingrad, and later from Astrakhan. Later on and until 1948, she was engaged in medical administrative work in the GUAS system of the NKVD.

In the years 1948-1958, V. T. Olefirenko worked at the State Institute of Physical Therapy (GIF) as a clinical staff physician and then junior scientific coworker. Since 1958, after the merger of GIF and the Central Institute of Health Resort Care, she has worked at the Central Scientific



Research Institute of Health Resort Care and Physical Therapy, for the past 15 years, as manager of the balneotherapeutic division.

Working for many years on questions of the study of various aspects of the mechanism of action of water and mud treatment procedures, V. T. Olefirenko headed a new direction in balneology on the specific effects of every balneofactor appearing against the background of the overall non-specific action.

In 1958 she defended her candidate's dissertation on the topic "On clinical and physiological justification of the use of pine baths for patients with hypertensive disease". In it she clearly showed the possibility of predicting the results of a course of treatment based on reactions of the organism to the first procedures. This position was supported in the studies of several investigators, and today the "initial bath test" is standard in resort practice.

The doctoral dissertation of V. T. Olefirenko was dedicated to the question of shaping and developing adaptative and restorative reactions of the organism under the influence of water treatment procedures.

While considering the effect of various balneo-procedures from general biological positions: intensification by training adaptation and restorative mechanisms of the body--she created on this basis a school of hydrobalneotherapeutists, whose followers work in medical and prophylactic and health resort and sanatorium institutions of the country.

Research findings obtained by V. T. Olefirenko have considerably expanded and deepened the general concept of neurohumoral-endocrinal means of realization in the body of a medical effect of water and mud treatment procedures. This has found wide recognition both in the USSR and in countries of the socialist camp.

V. T. Olefirenko's scholarly quest has gone on without interruption. She raised the vital problem of the comprehensive study of the essence of action and balneologic value of naturally prevalent and easily reproducible artificially sodium chloride mineral waters. As a result of fulfillment of the complex theme under the supervision of V. T. Olefirenko, new data have been obtained on the mechanism of action of these waters; optimum doses have been established and differential methods of treatment have been elaborated. This made it possible to expand indications for the use of sodium chloride waters.

V. T. Olefirenko was given the question of a need for profound study of the meaning and place in balneology of nitrogen-containing mineral waters. In the studies of V. T. Olefirenko and other investigators was proven the value of the nitrogen contained in these waters. It was also established that there was a medical effect of these waters in thyreotoxicosis, diseases of the CV system, especially IHD, cerebral atherosclerosis, in which nitrogen waters had previously not been used.

In the studies of V. T. Olefirenko and the coworkers of the division she manages, many aspects of the mechanism of action and medical use of turpentine baths have been studied; clinical and physiological justification of the use of contrast and eddy baths as well as other hydrotherapeutic procedures has been given.

Upon the initiative and with the direct participation of V. T. Olefirenko, the balneotherapeutic division of the institute has turned into a scientific, teaching and practical base. A first-class hydrotherapy basin has been rebuilt and many methods of hydrotherapy have been reactivated; the sulfide shop and mud baths have been totally reconstructed; two wells have been sunk on the institute's territory to provide the treatment center of the balneotherapeutic division of the institute with mineral water for external and internal use.

V. T. Olefirenko has conducted great pedagogical work, giving daily lectures on water and heat treatment for staff physicians and graduate students of the institute and for physicians working at the institute. Under the mentorship of V. T. Olefirenko have been defended 8 candidate's dissertations and several candidate's and doctor's dissertation studies have been prepared for defense.

V. T. Olefirenko has penned more than 130 scientific studies, including separate chapters in special handbooks and methodologic recommendations; she wrote many articles in recent editions of medical encyclopedias. She has received 8 patents for methods of treatment and collaborated with a group of physicians and engineers to design a special device for stretching the spine in the water.

The widely known monograph of V. T. Olefirenko "Water and Heat Treatment" has undergone two editions and is the bible not only for health resort specialists and physical therapists, but also specialists of several clinical profiles, as well as planners and builders of balneotherapeutic facilities.

V. T. Olefirenko has represented Soviet balneology with dignity at several international congresses in the USSR, Bulgaria, Poland, Czechoslovakia, East Germany and Yugoslavia.

V. T. Olefirenko has performed much party and social work. Over the course of many years she was deputy secretary, then secretary of the party bureau of the institute and member of the CPSU Plenum Management Committee of the Kiev rayon of Moscow. She was scientific secretary of the Moscow urban and All-Russian administrations, and for the past 18 years has been chief scientific secretary of administration of the All-Union Society of Physical Therapists and Health Resort Experts; within several years she entered the Council of Scientific Medical Societies of the Ministry of Health of the USSR; she has actively worked on the staff of the union problem commission of the USSR Academy of Medical Sciences on health resort treatment and physical therapy, and also on the editorial board of the journal "Voprosy kurortologii, fizioterapii i lechebnoy fizicheskoy

kul'tury"; she is a member of one of the expert commissions of the Committee on New Medical Technique, member of the scientific health resort commission of the Central and Moscow territorial councils on control of profsoyuz health resorts, etc.

For self-abnegating labor during war and peacetime, V. T. Olefirenko was awarded medals "For Labor Valor", "For Valor in World War II, 1941-1945", "For Valor in Honor of the Centennial of V. I. Lenin's Birthday", "Thirty Years of Victory in World War II, 1941-1945", badges "For Outstanding Health Care Worker", "For Outstanding Worker of Profsoyuz Health Resorts", etc.

In congratulating Valentina Tarasovna on this glorious date, we wish her good health, family happiness and further successes and creative joy in her relentless and fruitful labor.

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CSO: 1870

PUBLICATIONS

UDC 614.77 + 628.4](049.32)

SOIL HYGIENE AND SANITARY CLEANING OF POPULATED AREAS

Moscow GIGIYENA I SANITARIYA in Russian No 5, 1979 pp 89-90

[Review of book by V.M. Perelygin and V.V. Raznoshchik, Meditsina, 1977; by A.A. Minkh]

[Text] Soil hygiene and sanitary cleaning of populated areas are two very important subjects in the general plan for the protection of the environment. It becomes a sensitive question in periods of any scientific-technical progress during which the contamination of the soil is intensified with solid, liquid and gaseous emissions from industrial enterprises, coupled with the residues from chemical fertilizers and plant protective agents. Because of this, the book by V.M. Perelygin and V.V. Raznoshchik is of interest to hygienists and sanitation physicians; it should help them in introducing improvements in sanitary conditions.

In the first chapter "The problem of soil hygiene in populated areas" the data from foreign literature is analyzed concerning the contamination of municipal soils with domestic and commercial refuse. Also the decontamination problems of domestic and commercial wastes in our country are discussed, including the options of the introduction of new industrial and soil decontamination methods of immediate and long range use.

In Chapter II "Hygienic and economical importance of the soil", data are reported on the role of soil in the biological cycle in nature. A series of exogenic factors is pointed out with detrimental effects on the soil and sanitary conditions of life. Specifically it concerns soil contamination with industrial dust and gaseous emissions, solid industrial wastes, sewage and residual pesticides; the epidemiological importance of soil is stressed. The criteria of sanitary evaluation of the soil in populated areas developed and approved by the USSR Public Health Ministry (1977) are reported.

Of equal importance is Chapter III "Organization and control methods for sanitary state of the soil" in which general and specific problems are reviewed concerning preventive and maintenance sanitation control directed at assuring clean soil in populated areas. Plans and methods for standardization of chemical compounds in the soil are reported, related to the sanitary soil

control. The control measures for the storage and conservation of toxic industrial wastes are described. On this basis "The sanitary design, construction and operation rules for conservation of nonutilitarian industrial wastes" have been developed and approved (1977).

In Chapter IV "Hygienic prognosis of the sanitary state of soil", theoretical aspects of the prognostication of sanitary situations in the environment and the sanitary state of the soil are reported in relationship to economic and demographic shifts of the future. Development of related regulations, makes it possible to prognosticate scientific investigations of soil hygiene problems.

In Chapter V "Sampling methods and sanitary soil studies" the principles of the determination of nitrogen compounds in soil are discussed along with some microelements used in agriculture as microfertilizers (copper, zinc, cobalt, boron, molybdenum, vanadium, manganese) and heavy metal salts (mercury, lead, arsenic, fluorine) contaminating the soil. Determination methods for some organically derived soil contaminants are reported (DDT, HCCH, heptachlor, DCP, sevin, phenol, acrylic acid, nitrate, formaldehyde, methanol, chlorophos, petroleum products, and polycyclic hydrocarbons).

In the second part of the book (Chapters VI-XII) "Sanitary cleaning of populated areas", current methodologies and sanitary-technical approaches to the cleaning of populated areas have been described. Morphological composition and quantitative accumulation of domestic and industrial wastes are analyzed together with the organization of sanitary cleaning of populated areas and methods for decontamination of domestic wastes with proper attention to modern technological achievements.

A detailed description is given of the high capacity storage sites for solid refuse, biothermal composting plants (in Leningrad, Tashkent, Moscow), to thermal decontamination methods and reprocessing of solid domestic refuse, mechanical and chemical methods of decontamination and reprocessing. A short characteristic is given of the decontamination and preservation methods for solid industrial waste as well as domestic refuse with a comparative evaluation from the point of sanitary security and economic feasibility.

In spite of the small volume, this book contains current views on soil hygiene and sanitary cleaning of populated areas in light of the hygienic achievements and sanitary practice. This enables the sanitation physician to orient himself in respect to the ever increasing control of the sanitary state of the soil in populated areas in order to provide optimal sanitary living conditions for the population involved.

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CSO: 1870

PUBLICATIONS

UDC 612.6.052-06:614.7(049.32)

MUTAGENESIS AND THE ENVIRONMENT

Moscow GIGIYENA I SANITARIYA in Russian No 5, 1979 pp 88-89

[Review of book by N.P. Dubinen and Yu. V. Pashin, Nauka Publishers, Moscow, 1978; reviewed by Ye. D. Logachev]

[Text] In addition to general characteristics of antropogenic environmental pollutants, the authors report exhaustive tables of current data on mutagenic activity of pesticides, medicinal preparations, antihelminthic agents, some products used in chemical and food industry and on the mutagenicity of viruses.

Numerous examples have been cited throughout the book that multation induced by the products of antropogenic activity in somatic cells increase the number of malignant formations. For example, as a result of mutagenic activity of environmental agents on American continent, a 2 percent mortality increase is expected in the next few years due to "spontaneous" cancer; in 1973-75 it has been established in Japan that 80 percent of all substances causing gene mutations and chromosomal abberations are carcinogenic.

In connection with environmental pollution with numerous mutagens, the relationship between man and his surroundings became quite complex, because the on-regulated effects are tolerated less and less. Therefore the term "biosphere" began to be replaced by the concept "biotechnosphere" (p. 3).

The monograph has 12 chapters, each of which covers important medical genetic problems: "Introduction", "General characteristics of environmental pollution", "Atomic energy and mutagenesis", "Chemical mutagens in human surroundings", "Biological mutagenesis factors", "Genetic monitoring of the population and screening of chemical compounds", "Mutagenic tests of chemically individualized pollutants", "Biosphere models of pollution: macro- and microforms", "Extrapolation of data to humans". "Prognostic problems of possible genetic consequences of environmental pollution", "Control methods for environmental mutagens", "Conclusion"; the foreign literature has been well represented, domestic data are scanty (with exception of the works of N.P. Dubinin himself).

Among the biological factors of mutagenesis leading to mutations on chromosomal level, the authors describe viruses of smallpox, epidemic parotitis, chickenpox and live vaccines. Nonpathogenic viruses, forming a stream of foreign DNA in human cells could also lead to mutagenic properties.

The theory and practice of the principle of continuous observation is discussed in the monograph--the aspects of the monitoring of resources and processes occurring on earth. Monitoring of the genetic stock of man himself is the most important task of our time. It is concerned with registration of the number of mutations and comparison of the mutagenic rate of the offspring to that of their parents. A monitoring system in a global sense has been condensed into a table (Table 12).

In nature, increased mutation pressures lead to evolutionary changes directed towards the adaptation to environmental mutagens. Genetic adaptation can occur along the lines of evolutionary impulse processes such as the appearance of new strains resistant to pesticides among the fungi, insects, bacteria etc., this, however leads to a multitude of genetic victims among a given population due to natural selection. For man this is not acceptable and with "increasing mutagenic pollution of the biosphere, genetic adaptation of human population is impossible". The number of congenital pathologic defects is on the increase (in Japan some 10 percent of the newborn generation shows hereditary and congenital malformations). The authors believe that one of the urgent tasks of a global nature would be the establishment of a permissible degree of mutagenic products introduced into human environment. However, this task is very difficult because "even in animal experiments sometimes it is necessary to wait several generations in order to be able to assess the degree of mutagenicity of an agent". A table of the mutagenicity indexes of some environmental pollutants is included in the monograph, showing that the ecologic problems and the problems of environmental mutagens are tightly connected with social relationships.

It should be noted that the question of inherent (natural) mutagens in the biosphere and the vital problem for man--the mutagenicity of tobacco smoke, have not been adequately covered in the book.

The monograph by N.P. Dubinin and Yu. V. Pashin should be of interest to a wide range of biological and medical hygienic specialists.

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CSO: 1870

PUBLICATIONS

UDC 614.3-078:576.858](049.32)

PRINCIPLES OF SANITATION VIROLOGY

Moscow GIGIYENA I SANITARIYA in Russian No 5, 1979 pp 90-91

[Book by G.A. Bagdasar'yan, V.V. Vlodavets, R.A. Dmitriyeva and Ye. L. Lovtsevich, Moscow 1977 pp 200; reviewed by V.A. Gorbov]

[Text] The book consists of chapters devoted to intestinal and respiratory viruses, sanitation virology of the air, water, soil, everyday necessities and to isolation and identification methods of respiratory and intestinal viruses. An exhaustive literature coverage of domestic and foreign studies is provided. Therefore, there is little one can say on the completeness and quality of the material presented. This book is a desirable input into our hygienic and epidemiological literature and should be widely distributed. It should also be useful to the instructors of higher medical institutions and to students, since the lecturing level in this area of sanitation microbiology and epidemiology is still inadequate. This positive evaluation of the work of these four authors, nevertheless demands from us to make additional comments which should become helpful in the reissue of this book, which will be necessary in a few years. Naturally, the principles of science are published for longer periods than a year or two. Therefore it is necessary to supplement the "Principles of Sanitation Virology" in the following areas.

In any book on the principles of science a short historical overview of its development in the USSR and abroad must be given. It is well known that our science can pride itself more than that of any other country on the achievements and developments in human and plant virology; our scientists were among the first ones to bring attention to the sanitary problems of virology. The evolution of the scientific knowledge in this particular case is very instructive.

It is necessary to provide a special classification of viruses, more detailed and specific than that of general virology given in the book. Obviously the authors should develop special classification on such indicators as toxic properties of the viruses: virus groups-harmless inhabitants of the environment, pathogenic viruses causing anthroponosis, zoonosis and anthropozoonosis; the diseases found among humans should be clearly marked.

The wide distribution of pathogenic viruses, currently occupying a principal place in the epidemiological statistics of many countries is repeatedly pointed out in this book. We think that even now this problem could be classified at least by large regions of our globe, connecting it to geographical, climatic and if possible, to soil conditions. Such data could possibly be found in VOZ or in reports of individual investigators. In any case, specifically in the initial period of existence of sanitation virology, this would be very important for the orientation of the sanitation and epidemiological studies in virology.

It would be very desirable to give more detailed data on the occurrence of pathogenic viruses in the environment together with bacteria and clostridia causing analogous diseases. It is uncertain what role the authors ascribe to a number of microorganisms, which makes it unclear whether it could be possible to isolate some viruses as organisms significant from the sanitation aspects.

It is necessary to mention here two more problems which in our opinion are very important. In the process of locating the active viruses in the environment, the authors used the traditional but improper concept of "survivability". However, the duration of the periods—hours, day, months, which traditionally are specified as the ability to survive in spite of unfavorable conditions, leaves no doubt that the existence of viruses is much more complex and in any case, should include their reproductive ability. Therefore, we believe it is important to drop the term "survivability" which obscures the reality and to substitute it by a more scientific term "viability". Obviously, this term includes all life functions in the existence of a virus: reproduction, adaptability, death at the end of a biological life period and therefore the term "viability" assures the investigator, the sanitation physician and the epidemiologist of the feasibility of active contest with the virus by means of sanitation and antiepidemic measures, without waiting for the saving grace of a "year" in the fate of a virus. The science of microbiology needs this for the total liquidation of all infectious diseases.

The second observation is partially derived from the above paragraph, but it is important all by itself. The authors take the dissemination of pathological viruses in water, air and in soil to be equivalent. We believe that the material reported in the book points out the soil as the principal factor in sanitation virology. And yet, according to the accepted traditions, less attention has been paid to the soil than to air or water. Whatever has been said about the role of soil, makes the hygienist and the epidemiologist wonder about the fact that the soil is that all important link, removal of which helps the humanity in controlling and even in liquidation of viral diseases. It is well known that the soil method for decontamination of sewage is and will continue to be one of the more important methods. Also (this is convincingly treated in the book) both the viruses and the bacteria are found in the air in form of solid and liquid aerosols. Undoubtedly their deposition on the land surface of "cultured" dry land is a very important factor. This spread of the viruses is identical to the spread of chemical compounds in the ionosphere—the sphere controlled by human mind, according

to the terminology of V.I. Vernadskiy. To achieve total success, it is necessary to form a scientific basis for the direction of our activity concerned with improvement of sanitary conditions.

In summary, it must be acknowledged that the reviewed work contains much useful information for any type of virology or microbiology, for the sanitation physician and for the epidemiologist. It is obvious that this book will find many readers.

Additions which we have pointed out will be useful in the new edition of "Principles of sanitation virology" for which this book serves as a definitive basis.

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USSR/CSSR

UDC 576.852.18.098.31.095.18:577.182.54

CHLORTETRACYCLINE EFFECTS ON THE ENZYMES OF PRODUCER STREPTOMYCES
AUREOFACIENS

Moscow ANTIBIOTIKI in Russian Vol 24 No 4, Apr 79 pp 254-258 manuscript
received 24 May 78

HOSVTALEK, Z., JECHOVA, V., BEHAL, V. and CURDOVA, E., Institute of
Microbiology, CSSR Academy of Sciences, Prague

[Abstract] Determinations of the activities of several dehydrogenases and decarboxylases in cell-free extracts of *Streptomyces aureofaciens* RIA-57 showed that the presence of chlortetracycline (1000 µg/ml) during the disintegration, with alum, of this poor chlortetracycline producer markedly lowered enzyme activities. However, disintegration with glass beads in the presence of chlortetracycline had no significant effect on resultant enzyme activities, nor did addition of the antibiotic (200 µg/ml) to the enzyme assay mixtures. These results show that studies on the enzymes of producers of secondary metabolites may be affected by the presence of the metabolite during cell disintegration. References 16: 6 Czech, 10 Western.

USSR

UDC 577.182.82/.84'13

OXIDATION PRODUCTS OF TRIAMINOCARBOXYLIC ACIDS FROM ACTINOIDIN AND
RISTOMYCIN

Moscow ANTIBIOTIKI in Russian Vol 24 No 4, Apr 79 pp 251-254 manuscript
received 29 Nov 78

BERDNIKOVA, T. F., TOKAREVA, N. L., POTAPOVA, N. P. and LOMAKINA, N. N.,
Institute for the Search for New Antibiotics, USSR Academy of Medical
Sciences, Moscow

[Abstract] Conditions are described for potassium permanganate oxidation of the aglycones of actinoidin and ristomycin, which resulted in the release of triaminocarboxylic acids in which the three benzene rings were linked through oxygen. Spectral methods identified the methyl ester from ristomycin as methyl-3,5-bis-(4-methoxycarbonyl-phenoxy)-4-methoxybenzoate, and the methyl ester from actinoidin as methyl-3-(2-chloro-4-methoxycarbonyl-phenoxy)-5-(4-methoxycarbonyl-phenoxy)-4-methoxybenzoate. These compounds constitute the aromatic portion of the triaminocarboxylic acids present in the polycyclic glycopeptide antibiotics. Figures 2; references 8: 2 Russian, 6 Western.

USSR

UDC 612.398.192

EFFECTS OF PROLONGED LYSINE DIET ON BRAIN DISTRIBUTION OF FREE AMINO ACIDS IN THE RAT

Kiev UKRAINSKIY BIOKHMICHESKIY ZHURNAL in Russian Vol 51 No 3, May/Jun 79 pp 267-269 manuscript received 5 Jun 78

MENTESHASHVILI, N. P., Institute of Physiology imeni S. I. Beritashvili, Georgian SSR, Academy of Sciences, Tbilisi

[Abstract] Studies on growing white rats, 100-120 g in weight, demonstrated that low doses of lysine (120 mg/kg/day) alone or in combination with vitamins B₁, B₂, B₆, nicotinamide, and calcium panthotenate, resulted in redistribution of free amino acids in the brain and improved central nervous system function. The former consisted of elevations in most of the amino acids, particularly glutamine and asparagine (by 165% and 130%, respectively), and in methionine, aspartic acid, and alanine (144%, 115%, and 89%, respectively); the former consisted of markedly shortened latent periods in learning tasks. Other changes included a decrease in serine (by 60%), and elevation of GABA by 48%. Lysine increased by 233%. References 13: 1 Ukrainian, 4 Russian, 8 Western.

USSR

UDC 616.36-02:613.24]-07:616.633.831.9-074

XANTHURENURIA IN RATS WITH LIVER DAMAGE INDUCED BY PROTEIN AND CHOLINE DEFICIENCY

Moscow VOPROSY PITANIYA in Russian No 2, Mar/Apr 79 pp 53-55 manuscript received 15 Oct 77

VOLGAREV, M. N., SMIRNOVA, M. G. and YEKIMOVSKIY, A. P., Institute of Nutrition, USSR Academy of Medical Sciences, Moscow

[Abstract] Investigations conducted on 50-60 growing male Wistar rats on choline and protein deficient diets showed that initial stages of hepatic fibrosis were accompanied by xanthurenuria, which commenced at 2-3 months. Xanthurenuria become more pronounced during the following 9-12 months as liver pathology progressed and then gradually diminished with the onset of frank hepatic adenomas and nodular cirrhosis. Tryptophan loading did not potentiate xanthurenuria in the experimental animals nor lead to statistically significant changes in control rats. References 10: 4 Russian, 6 Western.

USSR

UDC 613.268-074:547.21.08

DETERMINATION AND COMPOSITION OF ALIPHATIC HYDROCARBONS IN SUNFLOWER,
COTTON, AND SOYBEAN OILS AND OIL CAKES

Moscow VOPROSY PITANIYA in Russian No 2, 1979 pp 60-65 manuscript received
3 Jul 78

POKROVSKIY, A. A. (deceased), PISAREVA, N. A., USHAKOVA, T. M., ELLER,
K. I. and MEDVEDEV, F. A., Institute of Nutrition, USSR Academy of Medical
Sciences, Moscow

[Abstract] A study was undertaken to determine the total concentration and fractional composition of the paraffins and cycloparaffins of Soviet varieties of sunflower, cotton, and soybean oils and their respective oil cakes. On the basis of methods utilizing gas-liquid chromatography, mass fragmentography, UV and infrared spectra determinations, and thin layer chromatography the results showed that unsaponifiable lipids accounted for 0.44-0.56% of the total hydrocarbon fraction in the oils and 0.12-0.21% in the respective oil cakes, while the total hydrocarbons ranged from 0.05-0.06% for the oils and from 0.01 to 0.03% of the sample mass for the cakes. Total isoprenoids for the oils and their cakes were 0.0001% for each plant, the sum of n-alkanes ranged from 0.01% to 0.02% for the oils and 0.002-0.007% for the cakes, while squalene ranged from 0.007-0.016% for the oils and 0.002% for sunflower oil cake. Figures 3; references 17: 8 Western, 9 Russian.

USSR

UDC 616.89-008.464-02:615.869

ELECTRIC SHOCK-INDUCED AMNESIA IN RATS

Moscow BYULLETEN' EKSPERIMENTAL'NOY BIOLOGII I MEDITSINY in Russian No 4,
1979 pp 295-297 manuscript received 3 May 78

KRUGLIKOV, R. I. and POLYANSKAYA, L. G., Laboratory of the Neurochemical Mechanisms of the Conditioned Reflex, Institute of Higher Nervous Activity and Neurophysiology, Academy of Sciences USSR, Moscow

[Abstract] Studies on the mechanism of electric shock (ES) induced retrograde amnesia in white rats were assessed in terms of changes in the brain and plasma levels of free amino acids (FAA). Application of ES to the parietal region of 180-200 g rats, with an established avoidance response, for 15 days, beginning 24 h after consolidation of the behavior pattern, resulted in marked deterioration of memory (conditioned behavior) and

concomitant changes in brain and plasma levels of some FAA. Brain concentrations of histidine, proline, and cystine fell sharply; arginine, threonine, glycine, tyrosine, and phenylalanine showed a more moderate decline, while serine, alanine, and isoleucine increased, and aspartic acid and glutamic acid remained unchanged. With the exception of tyrosine and plasma levels of the FAA increased. The results were interpreted that a key factor in amnesia was the change in the ratio of excitatory (glut + asp) to inhibitory (gly + pro) FAA from 11.69 in control animals to 38.99 in the experimental rats. The changes were at least partly due to a decrease in the permeability of the blood brain barrier. References 12: 3 Russian, 9 Western.

USSR

UDC 615.356:577.164.32].074:543.42

PHOTOMETRIC DETERMINATION OF FLAVONOIDS USING NITROUS ACID

Moscow FARMATSIYA in Russian No 2, 1979 pp 23-26 manuscript received 20 Feb 78

EL'-KOMOS, MISHEL', ILIYA and MAKSYUTINA, N. P., Kiev Institute for the Advanced Training of Physicians

[Abstract] Flavonoid compounds (flavonols, flavones, flavanones and chalcones) were reacted with nitrous acid and subjected to photometric measurement of their absorption spectra. Flavonols analyzed included quercetin, rhamnetin and robinin; flavones included luteolin and apin; the flavanone studied was liquiritigenin; the chalcone was isosalhippurposide. The absorption maxima and the extinction coefficients of the reaction products are given. Calibration plots are presented for the quantitative determination of liquiritigenin, luteolin, quercetin, isosalhippurposide, apin, robinin and rhamnetin. Figures 7; references 6: 3 Western, 3 Russian.

USSR

UDC 615.2.3.074:543.544

POTENTIAL FOR USE OF POLYAMIDE THIN LAYER CHROMATOGRAPHY FOR DRUG IDENTIFICATION

Moscow FARMATSIYA in Russian No 2, 1979 pp 26-28 manuscript received 1 Feb 78

LYAKINA, M. N. and BRUTKO, L. I., All-Union Scientific Research Institute of Pharmacy, Moscow

[Abstract] Nine alkaloids, four synthetic alkaloid analogs, three sulfanilamide preparations, two local anesthetics and two tuberculosis drugs were subjected to polyamide thin layer chromatography to find their R_f values. The alkaloids determined included atropine sulfate, scopolamine hydrobromide, salsoline hydrochloride, narcotine, papaverine hydrochloride, morphine hydrochloride, codeine base, pilocarpine hydrochloride and ephedrin hydrochloride. The synthetic alkaloid analogs were tropacin, spasmolytin, thiphen and neostigmine. Sulfacyl sodium, phthalylsulfathiazone and sulfaethidole were the sulfanilamide preparations. The local anesthetics were benzocaine and novocaine. Isoniazid and phthivazid were the tuberculosis drugs. The technique appears useful for identification of these substances in drugs. References 14 (Western).

USSR

UDC 615.225.2.074:543.42

SPECTROPHOTOMETRIC DETERMINATION OF BAMETHANE SULFATE

Moscow FARMATSIYA in Russian No 2, 1979 pp 28-31 manuscript received 6 Mar 78

BELIKOV, V. G. and KOCHANOV, V. V., Pyatigorsk Pharmaceutical Institute

[Abstract] A modification of differential spectrophotometry, the delta-E method, was applied in plotting the ultraviolet absorption spectra of bamethane sulfate 1-(4-hydroxyphenyl)-2-butylaminoethanol sulfate in aqueous solutions at 222 and 272 nm, in 0.1 N HCl at 225 and 272 nm and in 0.1 N NaOH at 242 and 291 nm. The differential absorption spectrum of bamethane sulfate has two maxima--242 and 291 nm. For more complete identification of the compound, some constants of the differential spectra were determined: half-width of absorption band, asymmetry factor, cumulative band intensity and strength of electronic transition oscillator. Identifying bamethane sulfate from the extinction coefficient of a 1 percent test solution gave overstated results and was plagued by systematic

error. But when the delta-E method was used, the effect of certain water-soluble fillers in the bamethane sulfate tablets (sugar and lactose) on optical density was minimized, since the test solution and the reference solutions had nearly the same filler concentrations. The determination error by the delta-E method does not exceed ± 0.5 percent. Figures 1; references 3: 1 Western, 2 Russian.

USSR

UDC 615.214.2.074

QUANTITATIVE CERIMETRIC DETERMINATION OF MEBICAR

Moscow FARMATSIYA in Russian No 2, 1979 pp 31-34 manuscript received 20 Aug 78

PAVLOVA, V. M., BERLYAND, A. S. and KNIZHNIK, A. Z., Moscow Medical Stomatological Institute

[Abstract] Redox properties of mebicar were studied in determining whether it can be heavily oxidized by high redox-potential compounds like potassium permanganate, potassium bromate and potassium bichromate, in an acidic medium. Cerium sulfate was used in the official cerimetric determination of mebicar. The reaction rate of mebicar oxidation by cerium sulfate was plotted with and without the presence of catalytic amounts of $MnSO_4$ in a sulfuric acid medium. The mebicar oxidation rate was examined as to how changing solution pH affected it. No marked change in oxidation rate was found for a range of solution acidities from 0 to 30 percent concentrated sulfuric acid. Mebicar determinations were also made in the powdered and the tablet form: relative errors of determination were ± 1.36 percent for the tablets and ± 1.55 percent for the injection solutions (prepared from powdered mebicar). Figures 1; references 8: 5 Russian, 3 Western.

USSR

UDC 615.22:547.918].014.41

CORRELATION BETWEEN CUMULATIVE EFFECT OF TEMPERATURE, LIGHT EXPOSURE AND REACTION TIME AND DEGRADATION OF CELANIDE

Moscow FARMATSIYA in Russian No 2, 1979 pp 34-37 manuscript received 10 Mar 78

BULENKOV, T. I., USPENSKAYA, S. I., AKASHKINA, L. V., GRIGOR'YEVA, T. V., SOKOLOVA, A. V. and SAFENINA, L. A., All-Union Scientific Research Institute of Pharmacy

[Abstract] In replacing biological methods of assaying cardiac glucosides, physicochemical factors like temperature, light exposure and reaction time were analyzed as affecting the degradation of celanide, a cardiac glucoside, in a reaction with xanthidrol reagent. Celanide was also determined in a reaction with a sulfuric acid-ethanol mixture. The analysis was made at three celanide concentrations: 0.02 percent and 0.04 percent solutions in 20 percent ethanol and in powdered form (conditionally, 100 percent concentration). By a complete type 2³ factorial experiment, the photometric method of determining celanide by its reaction with sulfuric acid at the steroid ring more clearly revealed the degradative changes in celanide resulting from exposure to light than was possible under the biological method. Contrariwise, relying on the sugar moiety in celanide reacting with xanthidrol was found of no value in finding changes in the cardiac glucoside caused by temperature, light exposure and reaction time. References 3 (Russian).

USSR

UDC 617-089.5-07:616.154.94:615.212.7

DETERMINATION OF BLOOD SOMBREVIN IN POTENTIATED ANESTHESIA

Moscow FARMATSIYA in Russian No 2, 1979 pp 37-40 manuscript received 8 Jun 78

DEMENT'YEVA, N. N., TSVETKOVA, N. A., KULESHOVA, M. I. and KULIKOV, S. A., All-Union Scientific Research Institute of Pharmacy, Moscow; First Moscow Medical Institute imeni I. M. Sechenov

[Abstract] Changes in blood sombrevin concentration in patients were studied when the patients had been given sombrevin together with seduksin. Eleven patients in a traumatological department, 17 to 70 years of age, were anesthetized with 500 mg sombrevin and 10 mg seduksin. For comparison of potentiated anesthesia with monoanesthesia, eight patients were

administered only sombrevin (500 mg), by slow infusion at 10-12 mg/s. Anesthesia lasted twice as long in the former approach. Samples of 0.8-1 microliters were analyzed by direct gas chromatography. The sensitivity of the method was $1 \cdot 10^{-7}$ g/ml. One chromatographic analysis took 20 min. The decrease in blood sombrevin in both anesthesia methods can be described by a system of exponential equations, Figures 3; references 2: 1 Russian, 2 Western.

USSR

UDC 616.895.8+616.892.3]-008.9

PHOSPHOLIPID, CEREBROSIDE AND CHOLESTEROL METABOLISM IN PATIENTS WITH SCHIZOPHRENIA AND AGE-CONDITIONED PSYCHOSES

Kiev VRACHEBNOYE DELO in Russian No 4, Apr 79 pp 89-92

POLISHCHUK, I. A., deceased, GORODKOVA, T. M. and CHERNITSKAYA, I. I.,
Chair of Psychiatry, Kiev Institute for the Advanced Training of Physicians

[Abstract] Since not only histomorphological but also certain clinical features of schizophrenia and psychosis resemble those of organic cerebral processes, including vascular, atrophic, and neuropilidoses, the authors performed a comparative study of phospholipids (their fractions) glycolipids and cholesterol in the blood and cerebrospinal fluid (CSF) of patients with schizophrenia and organic age-conditioned psychoses, using thin-layer chromatography and other tests. Preliminary findings of a 7-year study of 87 patients are presented. It is established that the CSF of schizophrenics contains greater amounts of all cholesterol fractions than does the CSF of patients with age-conditioned psychoses. On the other hand, the sphingomyelin content of the CSF of psychotics increases but in the CSF of schizophrenics it sharply decreases. This implies that in schizophrenia, particularly in its acute stages, the processes of demyelination are more intense than in age-conditioned psychoses, while the synthesis of sphingomyelin is blocked. As for cerebroside, their content is markedly higher in the blood and CSF of schizophrenics. Another important feature of phospholipid metabolism in the brain of schizophrenics is the steady decrease in the phosphoinositol content of CSF, presumably due to the increased intake of phosphoinositides by the brain to compensate for the insufficient energy (calcium-transport-phosphorus) metabolism in the brain of schizophrenics, discovered by the author and denoted by the term "hypoenergiism" by Polishchuk ("Biokhimiya i Sindromy v Psikiatrii" [Biochemical Syndromes in Psychiatry], Kiev, 1967). This study reflects only the organic aspect of schizophrenia as expressed in severe metabolic disorders of the complex compounds participating in the structure and functions of the cerebral membranes. References 5 (Russian).

USSR

UDC 612.172-06:612.275.1.017.2

EFFECT OF ADAPTATION TO HIGH ALTITUDE HYPOXIA AND PHYSICAL EXERTION ON THE VARIABILITY OF RHYTHM AND FORCE OF CARDIAC CONTRACTIONS

Moscow KARDIOLOGIYA in Russian No 2, 1979 pp 105-107 manuscript received 22 Dec 77

PSHENNIKOVA, M. G., GIBER, L. M. and ZAKHAROV, M. YU., Laboratory of Pathophysiology of the Heart (director: professor F. Z. Meyerson) of the Institute of General Pathology and Pathological Physiology of the USSR Academy of Medical Sciences, Moscow, and the Department of Faculty Pediatrics with Propedeutics of Children's Diseases (head: docent V. P. Nastenko) of the Kuban' Medical Institute imeni Krasnaya Armiya, Krasnodar

[Abstract] White male rats, each weighing 250-350 g, were studied as to the effect of adaptation to high-altitude hypoxia and physical exertion on cardiac contractile force and contraction intervals. The contractile function of the heart was examined in an acute experiment with opened thoracic cavity and with artificial respiration under urethane narcosis (160 mg per 100 g bodyweight, given intramuscularly). Contractile function parameters were determined at relative physiological rest and with maximum isometric load on the heart caused by total clamping of the aortic ostium for 30 s. Rat adaptation to high-altitude hypoxia had been carried out in the Mount El'sburg area on Terskol peak, 3200 m elevation, for 40 days. Rats adapted to high-altitude hypoxia showed no variability in cardiac rhythm when at relative physiological rest, compared with the control group; fluctuations in contractile force based on systolic pressure were less than half the values in the control animals. Under conditions of exertion, adaptation was found to lead to coefficients of variation that were larger in the first 10 s of loading in the form of clamped aortic ostium for all animals of all groups than pre-loading indicators. But the adapted animals showed statistically, reliably smaller variations than the other animal groups. Adaptation to physical load was also found to stabilize the main parameters of the cardiac contractile function during maximum isometric cardiac loading caused by clamping of the aortic ostium. References 16: 12 Russian, 4 Western.

USSR

SCIENTIFIC CONFERENCE

Moscow RYBOVOODSTVO I RYBOLOVSTVO in Russian No 2, 1979 p 9

SMELOVA, I.

[Abstract] The 16th Scientific Conference on the Biological Foundations of Fisheries in the Waters of Central Asia and Kazakhstan was held in September, 1978 at the Issyk-Kul'skaya Biostation of the Kirgiz SSR Academy of Sciences in Cholpon-Ata. The 120 communications that were presented dealt with all aspects of fish production, with particular attention devoted to the Sea of Aral, the level of which continues to fall and in which the migratory fish are in danger of disappearing. The following biennial conference will be held in 1980 in Alma-Ata.

USSR

AUTOMATIC ANALYZER OF WATER STABILITY OF MIXED FEEDS

Moscow RYBOVOODSTVO I RYBOLOVSTVO in Russian No 2, 1979 p 10

CHAUISOVSKIY, G., Zaporozh'ye Oblast Agricultural Administration

[Abstract] Description is provided for a device designed to determine water stability of mixed feeds intended for pondfish. Essentially, the potentiometric instrument measures water fluctuation in a capillary glass column connected to a receptacle, containing the sample to be analyzed, via a porous glass partition. Water uptake by the feed--an indication of its stability in water--corresponds to the change in the water level in the capillary and is recorded on a scale calibrated in ml H₂O/min. Figures 2.

^{60}Co ACCUMULATION IN FRESH WATER PLANTS UNDER NATURAL CONDITIONS

Sverdlovsk *EKOLOGIYA* in Russian No 2, 1979 pp 104-106 manuscript received 18 Jul 78

TRAPEZNIKOV, A. V. and TRAPEZNIKOVA, V. N., Institute of Plant and Animal Ecology, Ural Science Center, USSR Academy of Sciences

[Abstract] Determinations were made of ^{60}Co coefficients of accumulation in some fresh water plants in the Urals, with a view toward selection of bioindicators of radioactive pollution in the vicinity of nuclear power stations. Studies on the following plants (average coefficient of accumulation)--*Ceratophyllum demersum* (33,500), *Elodea canadensis* (21,500), *Lemna minor* (19,100), and *Potamogeton pectinatus* (8500)--demonstrated that *E. canadensis* and *C. demersum* can be recommended as biological indicators of ^{60}Co pollution of the environment. References 4: 3 Russian, 1 Romanian.

USSR

UDC 615.339:576.858.095.383]:615.281.8

ANTIVIRAL ACTIVITIES OF INTERFERON AND ITS INDUCERS IN HUMAN LYMPHOBLASTOID AND SOMATIC CELLS

Moscow ANTIBIOTIKI in Russian Vol 24 No 4, Apr 79 pp 294-299 manuscript received 4 Nov 78

NOVOKHATSKIY, A. S., LABZO, S. S. and TSAREVA, A. A., Institute of Virology imeni D. I. Ivanovskiy, USSR Academy of Medical Sciences, Moscow

[Abstract] Studies were conducted on the relationship of cell type (lymphoblastoid lines derived from Burkitt's lymphoma--Raji and Namalva CL, and human embryo fibroblasts--HEF), interferon (fibroblast or lymphoblastoid), interferon inducers (gossypol, poly I-C, phage f2 RNA--RFF2), in relation to viral multiplication (Semliki forest virus, Sindbis virus, or VEE alpha viruses) and cellular DNA biosynthesis. The results demonstrated that the interferons and interferon inducers inhibited viral reproduction to various degrees depending on the cell line and virus in relation to the dose of the interferon or inducer. In particular, interferon and gossypol were highly effective in the Raji-Semliki virus system, while RFF2 was especially effective in the HEF-VEE system; the drug remantadine was equally effective in both systems. Inhibition of viral replication was not due to inhibition of DNA synthesis, since the effects were rather stimulatory with RFF2 and poly I-C, while gossypol inhibited DNA synthesis in Raji, HEF, and human embryo lung cells. Interferons were most effective as viral inhibitors in cells from which they were derived. On an over-all basis, the Raji-Semliki virus system appears to be best suited for these types of studies. Figures 1; references 23: 3 Russian, 20 Western.

USSR

UDC 615.835.3.015.46

INHIBITION OF HUMORAL ANTIBODY RESPONSE BY HYPERBARIC OXYGEN

Moscow BYULLETen' EKSPERIMENTAL'NOY BIOLOGII I MEDITSINY in Russian No 4, 1979 pp 320-322 manuscript received 14 Jul 78

BOXERIYA, L. A., FROLOVA, M. A. and KOSTAVA, V. T., Institute of Cardiovascular Surgery imeni A. N. Bakulev, USSR Academy of Medical Sciences, Moscow

[Abstract] Investigations were conducted on the possible role of hyperbaric oxygen as an immunodepressant on 18-20 g male CBA mice subjected to oxygen

toxicity (40-45 min exposure to oxygen at 3.6 atm pressure until convulsions appeared). Intraperitoneal immunization of such mice with 10^7 SRBC showed depressed hemolysin and hemagglutinin responses, leucocytopenia (by 46%; $P < 0.05$) and lymphocytopenia (by 71%; $P < 0.05$) with recovery in 24 h, as well as diminished antibody forming cells (AFC) in the spleens of the experimental mice vis-a-vis control animals. With 10^7 SRBC the results were equivalent with single or multiple (daily for 5 days) exposures to hyperbaric oxygen. Immunosuppression with 5 daily sessions, followed by immunization with 10^8 SRBC, in addition to depressing the humoral immune response, also showed depression of AFC by 44% ($P < 0.05$) 5 days after immunization, as well leucocytopenia (by 22%; $P < 0.05$) and lymphocytopenia (by 39%; $P < 0.05$) without evidence of recovery. Thus, it appears that hyperbaric O_2 offers a new immunosuppressant modality on the basis of the present observations. Figures 2; references 7: 5 Russian, 2 Western.

USSR

UDC 611-018.53:576.858.095.383.07

DETERMINATION OF HUMAN INTERFERON WITH AN IMMUNOMICROFLUOROMETRIC METHOD

Moscow BYULLETEN' EKSPERIMENTAL'NOY BIOLOGII I MEDITSINY in Russian
No 4, 1979 pp 322-325 manuscript received 3 Jul 78

SKURKOVICH, S. V., OL'SHANSKIY, A. YA., SAMOYLOVA, R. S. and YEREMENKO, YE. I., Laboratory of Leukemia Immunology, Central Institute of Hematology and Blood Transfusion, Moscow

[Abstract] Description is provided of a microfluorometric immunoassay for human leucocyte interferon (HLI), which rests on competitive binding of free HLI to specific donkey anti-HLI labeled with fluorescein isothiocyanate (FITC) in the presence of HLI coupled to ConA-Sepharose 4B beads in the direct fluorescence inhibition test, or the subsequent addition of rabbit FITC-labeled anti-donkey Ig antibody to a system in which the anti-HLI is unlabeled (indirect fluorescence inhibition). Evaluation showed that the direct method yielded titers somewhat lower than those obtained in standard CPE inhibition tests, while the indirect method provided titers equivalent to those of the CPE inhibition test. The immunofluorescence approach offers the advantages of specificity, sensitivity, reproducibility, and speed. Figures 1; references 12: 2 Russian, 8 Western.

USSR

UDC 612.112.94:612.398.145.1

NATURE OF SUPPRESSOR CELLS BLOCKING ACTIVATION OF DNA SYNTHESIS IN MIXED LYMPHOCYTE CULTURES

Moscow BYULLETEN' EKSPERIMENTAL'NOY BIOLOGII I MEDITSINY in Russian
No 4, 1979 pp 325-328 manuscript received 3 May 78

BRONDZ, B. D., KHACHIKYAN, YE. YA. and KARAULOV, A. V., Laboratory of Immunochemistry and Tumor Diagnosis, Oncologic Scientific Center, USSR Academy of Medical Sciences, Moscow

[Abstract] An MLC (mixed lymphocyte culture) reaction was used to define the nature of suppressor cells of DNA synthesis that arise in mice immunized with allogenic spleen or tumor cells. The immune cells were derived from B-10.D2 (H-2^d) mice immunized with sarcoma MX-11 from C57BL/10 mice. In the MLC test system the ratio of normal to immune lymphocytes was 2.5:1 to 1.5:1; the addition of the immune cells led to 47-88% inhibition of DNA synthesis. Pretreatment of the immune cells with mitomycin C, anti-theta antiserum, or anti-mouse Ig antiserum did not modify the inhibition pattern; however, adsorption of the immune cells to plastic surfaces or treatment with carrageenan abolished the inhibitory effects. On the basis of these findings the suppressor cells were identified tentatively as macrophages. Figures 2; references 15: 1 Russian, 4 Czech, 10 Western.

USSR

UDC 612.017.1-06:612.419

PARTICIPATION OF HEMOPOIETIC STEM CELLS IN THE IMMUNE RESPONSE

Moscow BYULLETEN' EKSPERIMENTAL'NOY BIOLOGII I MEDITSINY in Russian No 4, 1979 pp 330-332 manuscript received 4 May 78

KOZLOV, V. A. and GROMYKHINA, N. YU., Laboratory of Immunopoiesis Regulation, Institute of Clinical and Experimental Medicine, Siberian Branch, USSR Academy of Medical Sciences, Novosibirsk

[Abstract] Studies were conducted on the relationship between the number of antibody-forming cells in the spleens of high responders (CBA mice) and low responders (C57BL mice) to sheep RBC and formation of hemopoietic colonies in sublethally irradiated mice differing in high (C57BL) or low (CBA) background formation of such colonies. Analysis of the results showed that injection of the mice with 2×10^7 , 2×10^8 , or 2×10^9 sheep RBC yielded maximum number of antibody-forming cells with the 2×10^8 dose,

with the response falling off with either the lower or higher dose. Furthermore, the response in the CBA mice was 9-10 times greater than that of the C57BL mice. In the case of both lines of mice, immunization with the sheep RBC stimulated formation of hematopoietic colonies in the spleen; the number of colonies increased with the increase in sheep RBC. The data were interpreted to indicate that sheep RBC functioned in analogy to inert particles by blocking the RES and thereby potentiating hematopoietic colony formation. It also appears that competition between the erythroid and myeloid stem cells, on the one hand, and the lymphoid stem cells, on the other, for space in the spleen compartment leads to inhibition of splenic antibody-forming cells. Tables 1; references 14: 7 Russian, 7 Western.

CZECHOSLOVAKIA

EVALUATION OF IMMUNIZATION AGAINST INFLUENZA WITH ADENOVIRUS CONTAINING STRAINS A/PORT CHALMERS AND A/SWINE

Prague CESKOSLOVENSKA EPIDEMIOLOGIE MIKROBIOLOGIE IMUNOLOGIE in Czech
Vol 27 No 6, Dec 78 pp 355-365 manuscript received 18 Oct 77

SIVAK, S., ORAVCOVA, V., SLACIKOVA, M., LANCOVA, J., BORSKA, K.,
MILOSOVICOVA, A., PECI, J. and SYKOROVA, M., Kraj Station of Hygiene of
the West Slovak Kraj, Bratislava; Research Institute for Microbiology
and Epidemiology, Bratislava; Okres Station of Hygiene, Nove Zamky and
Galanta

[Abstract] Reactions and antibody responses to influenza after administration of bivalent A/Port Chalmers and A/Swine were studied. The bivalent showed low reactogenicity. In age groups to which A/Swine was administered for the first time it showed low immunogenicity. Even re-vaccination did not produce antibody levels equal to those produced by antigens. Vaccination with this substance is specific only against the one specific strain. High amounts of the vaccine would be needed to obtain general protection against various influenza-causing bacterial strains. It is therefore important to develop a more effective vaccine. References 10: 2 Czech, 2 USSR, 6 Western.

USSR

UDC 616.28-008.1:614.872.4

COMPARATIVE ASSESSMENT OF THE EFFECT OF DIFFERENT TYPES OF INDUSTRIAL NOISE ON HEARING

Kiev ZHURNAL USHNYKH, NOSOVYKH, I GORLOVYKH BOLEZNEY in Russian No 2, Mar/Apr 79 pp 20-24

KUBLANOVA, P. S., SINEVA, YE. L., KANEVSKAYA, ZH. S. and MAKSIMOVA, L. I., Moscow Order of Labor's Red Banner Scientific Research Institute of Hygiene imeni F. F. Erisman

[Abstract] Audiometric evaluation was made of the hearing of 240 subjects exposed to a constant background noise of 95 dB with superimposed 600-800 msec noise bursts of 110-117 dB, and on a group of 262 individuals exposed to the equivalent background noise only. More than half of the subjects had been engaged in their occupation for more than 10 years; the age range was 20-49 years. The first group consisted of pressers, straighteners, and cutters, while the second group was composed of lathe hands and fitters. The audiometric and other studies revealed that bursts of intermittent noise were much more damaging to the hearing analyzer and that such workers developed cochlear neuritis twice as frequently as the unexposed workers. In addition, the onset of cochlear neuritis occurred earlier in workers exposed to noise burst, and showed more aggressive progression to the spiral ganglion and the auditory nerve, leading eventually to diminished speech perception. References 9: 8 Russian, 1 Western.

USSR

UDC 613.2:[615.277.4:547.495.9

CARCINOGENIC NITROSO COMPOUNDS IN FOOD PRODUCTS

Moscow VOPROSY PITANIYA in Russian No 2, Mar/Apr 79 pp 12-21 manuscript received 16 Mar 78

ARKHIPOV, G. N., ZHUKOVA, G. F. and PIMENOVA, V. V., Institute of Nutrition, USSR Academy of Medical Sciences, Moscow

[Abstract] A literature survey is presented of the problem of nitroso compound (NC) in foodstuffs, as well as precursors that are transformed into this carcinogen(s) in vivo. Coverage is given to the different types of compounds, their origins in foodstuffs, metabolism, relative carcinogenicity, and elimination from the body. Mention is made of the inhibition of in vivo synthesis of NC by ascorbic acid, as well as gallic acid, cysteine, glutathione, and various food additives the mechanism of action of which is not fully understood. References 95: 5 Russian, 90 Western.

USSR

UDC 612.815:612.15

NEUROTOXIC EFFECT OF DILOR

Kiev FIZIOLOGICHESKIY ZHURNAL in Russian No 2, Mar/Apr 79 pp 210-212
manuscript received 24 Jan 78

KHOMENKO, N. R., All-Union Institute of Hygiene and Toxicology of
Pesticides, Polymers and Plastics, Kiev

[Abstract] Dilor is a chlorinated organic product of diene synthesis, used for plant protection. The author studied the influence of dilor on the functional status of the neuromuscular, peripheral and central nervous systems. The experiments were performed on cats and white rats, the functional status of the peripheral nervous system and transmission of excitation through a nerve-muscle synapse studied in the rats, which were divided into three groups. One group was the control, the other three groups received: 1,000 mg/kg dilor one time; 100 mg/kg daily for three months; and 20 mg/kg daily for six months. Dilor was found to cause deterioration of the functional status of the peripheral nervous system. The long-term exposures were most harmful. In the doses studied, dilor caused a reliable change in the functional status of the central nervous system as well, and disrupted transmission of excitation across the nerve-muscle synapse. References 2 (Russian).

USSR

UDC 612.13:615.916:546.815]-0.36.12-07

CHANGES IN HEMODYNAMICS IN OCCUPATIONAL EXPOSURE TO LEAD AGAINST THE BACKGROUND OF NERVOUS TENSION

Kiev VRACHEBNOYE DELO in Russian No 4, Apr 79 pp 101-106

LYSINA, G. G., Functional Diagnostics Laboratory, Kiev Scientific
Research Institute of Labor Hygiene and Occupational Diseases

[Abstract] In the typographic, radio engineering and other industries the effect of lead vapors is sometimes combined with nervous tension due to stress. In this connection, the early detection of preclinical changes in the circulatory system was investigated as a function of the combined effect of these occupational factors. A study of 102 printers and typesetters, whose work requires concentrated attention and is performed in premises containing lead vapors, was carried out. Analysis of the findings on mean arterial pressure and vascular tonus showed that the pattern of variation in these indexes differed depending on length of work seniority in different groups. Most persons with a low work seniority

(up to 5 years) displayed greater lability of vegetovascular reflexes and a greater tendency to hypertension. In persons with medium work seniority (5 to 10 years) the state of the cardiovascular system becomes "normalized," as it were, owing to adaptation, but in persons with high work seniority (upward of 10 years) vascular tonus and arterial pressure tend to increase owing to depletion of the adaptive potential of the cardiovascular system. In view of this, preventive medical examinations of printers are recommended, making use of such most-informative indicators of the circulatory state as the pulse wave propagation rate, the rheographic index, specific peripheral resistance, and "vegeto-vascular" tests, in order to detect such preclinical symptoms of the effect of lead combined with nervous tension of the function of cardiovascular system. Figures 1; references 7 (Russian).

USSR

UDC 613.62:547.533-057-07

CLINICO-HYGIENIC PARALLELS IN PRESENT-DAY PRODUCTION OF TOLUIDINES

Kiev VRACHEBNOYE DELO in Russian No 4, Apr 79 pp 110-113

VASLENKO, N. M., SONKIN, I. S., FILATLOV, B. G., KRYLOVA, YE. V., ZVEZDAY, V. I., YAREMENKO, V. D. and YERMILOVA, I. I., candidates of medical sciences, Laboratory of Industrial Toxicology, Khar'kov Scientific Research Institute of Labor Hygiene and Occupational Diseases

[Abstract] Toluidines (ortho-, meta-, and para-isomers) are important intermediate products in the manufacture of various organic dyestuffs, and thus large groups of workers are in contact with these chemicals. Yet, the toxicology of toluidine has until now been relatively uninvestigated. Hence a group of 73 workers in ortho- and para-toluidine shops in which the concentration of vapors of these toluidines was 2.5-3.9 and 2.05-3.3 mg/cu m, respectively, during 1967-1975, were medically examined for state of internal organs, the nervous system, peripheral blood, and urine. No somatic or neurological changes different from those in the control group could be found. However, the hematological indexes for the two groups differed. One to 2% of persons in the experimental group were found to have reticulocytosis. The detection of Heinz bodies in individual cases points to the presence of degenerative changes in the hemoglobin molecule which result in hemolysis and irritation of erythropoiesis. This is confirmed by the lower content of sulfhydryl blood groups (which protect the hemoglobin molecule against the injurious effect of oxidizing agents) in the blood of toluidine-shop workers. This is also confirmed by the fact that the methemoglobin level was no higher than 2% in the control group whereas among the ortho-toluidine shop workers it was recorded in 30±10% of cases and among the para-toluidine shop workers, in

20+9% of cases. In this connection dysuric complaints have been made by the experimental group, particularly by workers with high seniority, along with papillomas of the urinary bladder (one or two cases). Microscopic analysis of the urine of the experimental group revealed an increased number of irritants of the urinary tract (greater excretion of bladder epithelium, microhematuria, traces of albumin in urine). Thus the occupational etiology of pathological changes in the urine of toluidine shop workers, especially those working with orthotoluidine, is incontestable. These findings point to a need to upgrade the hygiene and safety of labor in toluidine production premises and to reexamine the standards for the maximum permissible levels of toluidines in the air of the premises. References 3 (Russian).

USSR

UDC 615.917:547.412.4]-0.15.4:616.36+616.61]-008-06

EFFECT OF ACETYLCYSTEINE ON THE INDICATORS OF FUNCTIONAL STATE AND HISTOSTRUCTURE OF THE LIVER AND KIDNEYS IN ACUTE ETHYLENE DICHLORIDE POISONING

Kiev VRACHEBNOYE DELO No 4, Apr 79 pp 113-117

KOKAROVITSEVA, M. G. and PETROVSKAYA, O. G., Kiev, Laboratory of Experimental Therapy, All-Union Scientific Research Institute of the Hygiene and Toxicology of Pesticides, Polymers and Plastics

[Abstract] Ethylene dichloride distinctly affects the parenchymatous organs and is accompanied by the development of toxic hepatopathy and, in severe cases, of acute hepatic and renal insufficiency. In this connection, the effect of acetylcysteine on certain indicators of the functional state and histostucture of the liver and kidneys in acute poisoning with ethylene dichloride, such as the activity of the organospecific hepatic enzyme sorbitodehydrogenase and the activity of the marker enzyme of the reticuloendothelium of the liver cell--glucoso-6-phosphatase--X was investigated. The functional state was determined as a function of the blood test for urine clearance. The experiments were conducted on white male rats which were administered ethylene dichloride and subsequently, starting with the second day of poisoning, given acetylcysteine in doses of 300 mg/kg, twice. In the poisoned rats, sorbitodehydrogenase activity is much higher in the blood serum while the activity of the marker enzyme decreases, which demonstrates that ethylene dichloride strikes first at the membranes of the hepatic reticuloendothelium. Histological examination of the parenchymatous organs revealed marked dystrophic changes combined with polyemia. Treatment of rats with acetylcysteine restored more or less the normal values of these indicators, and it also was found to

prevent to a large extent any acute decrease in the ability of the kidneys to cleanse the blood of metabolism products. Acetylcysteine similarly suppresses the pathological process in the kidneys, and the mechanism of its action appears to be largely due to its detoxification of the metabolites of ethylene dichloride. References 5 (Russian).

USSR

UDC 615.281:547.918

ANTIMICROBIAL SPECTRA OF CERTAIN TRITERPENE AND STEROID GLYCOSIDES

Moscow ANTIBIOTIKI in Russian Vol 24 No 4, Apr 79 pp 270-273 manuscript received 31 Oct 78

SHCHEGLOV, V. V., BARANOVA, S. I., ANISIMOV, M. M., ANTONOV, A. S., AFIYATULLOV, SH. SH., LEVINA, E. V., SHARYPOV, V. F., STONIK, V. A. and YELIAKOV, G. B., Pacific Ocean Institute of Bioorganic Chemistry, Far East Scientific Center, USSR Academy of Sciences, Vladivostok

[Abstract] Determinations of the antimicrobial spectra of 9 triterpene and steroid glycosides isolated from higher terrestrial plants and marine invertebrates (Echinodermata) showed that all possessed some antifungal activity (*Saccharomyces carlsbergensis*, *Candida albicans*, *C. tropicalis*, *Penicillium niger*, *Mucor* sp.), but not antibacterial (*E. coli*, *Staphylococcus aureus*). Triterpene glycosides derived from animals (holothurins A and B, stichoposids A and C) demonstrated much greater activity than did the compounds isolated from plants. Lengthening the carbohydrate chain from 2 to 6 monosaccharide moieties had no effect on activity. References 18: 6 Russian, 12 Western.

USSR

UDC 615.332:576.852.183].012.6

PRODUCTION OF WIDE SPECTRUM ANTIBIOTICS BY MICROMONOSPORA

Moscow ANTIBIOTIKI in Russian Vol 24 No 4, Apr 79 pp 243-246 manuscript received 17 Nov 78

VOSTROV, S. N., BIBIKOVA, M. V. and IVANITSKAYA, L. P., All-Union Scientific Research Institute of Antibiotics, Moscow

[Abstract] Conditions are described for the screening of the culture fluid of 172 *Micromonospora* species for broad spectrum antibiotic activity in disc sensitivity tests on *Staphylococcus aureus* 209P, *Bacillus macroides* 337, *E. coli* 675, and *Comamonas terrigena* ATCC 8461. The results demonstrated that 92 species produced such antibiotics, of which 18 (10.4%) showed activity against both the Gram positive and negative bacteria. Fractionation of the culture media on carboxylate ion exchange columns (Amberlite IRC-50 in NH₄⁺ form or KB in Na⁺ form) increased to 34 (19.7%) the number of species detected to produce broad spectrum antibiotics. References 9: 1 Russian, 8 Western.

CERTAIN ASPECTS OF ACTINOMYCIN C BIOSYNTHESIS

Moscow ANTIBIOTIKI in Russian Vol 24 No 4, Apr 79 pp 246-250 manuscript received 18 Oct 78

ORLOVA, T. I., ALEKHOVA, T. A. and SILAYEV, A. B., Antibiotics Laboratory, Biology Faculty, Moscow University imeni M. V. Lomonosov

[Abstract] Studies were conducted on actinomycin C biosynthesis by *Actinomyces* sp. 26-115 mycelia and protoplasts formed by lysozyme treatment of the mycelia. Based on the uptake of radiolabeled amino acid precursors, the study showed that both the protoplasts and the mycelia synthesized actinomycin C in the presence of 1% and 10% sucrose solutions (used to stabilize protoplasts) and, furthermore, that biosynthesis was greater in 10% sucrose and that mycelial production exceeded that of the protoplasts. Unlike the case with other actinomycetes, *Actinomyces* sp. 26-115 did not require galactose for actinomycin C biosynthesis, synthesis was not repressed by glucose nor inhibited by the presence of exogenous actinomycin C. Figures 2; references 15: 5 Russian, 10 Western.

CARDIOVASCULAR SYSTEM IN BRUCELLOSIS

Moscow KLINICHESKAYA MEDITSINA in Russian No 4, 79 pp 77-81 manuscript received 9 Aug 78

BELOZEROV, YE. S. and ZHAROVA, N. V., Chair of Infectious Diseases, Semipalatinsk Medical Institute

[Abstract] Brucellosis displays certain special clinical features, primarily the intensification of the allergic component and a more frequent course of the chronic form of the rheumatoid type. Knowledge of the effect on the cardiovascular system is of definite interest in this connection. A study of clinical symptoms of injury to the cardiovascular system in 477 patients with brucellosis (101 with the acute form caused by *Brucella* of the goat-sheep type; 126 with the subacute form; and 250 with the chronic form), performed with the aid of N. N. Savitskiy's mechanocardiograph and according to tachyscillographic and sphygmographic data, was performed. Dullness of cardiac tones, systolic apex murmur, and EKG changes depending on the stage of the disease were clinically

detected. Myocarditis developed in 5.8% of the patients with subacute brucellosis, while myocardiodystrophy developed in 5.4% of the patients with acute brucellosis and in 16.2% of the patients with chronic brucellosis. All the forms of brucellosis are accompanied by a fall in minimum arterial pressure, a rise in pulse pressure and hemodynamic stroke, and an increase in the pulse wave propagation rate along arteries of the muscular type, as well as a rise in the modulus of elasticity and general peripheral resistance. In patients with acute and subacute brucellosis, the stroke volume output increases, and in patients with acute brucellosis this is accompanied by an increase in the capacity of the left ventricle. References 6 (Russian).

USSR

UDC 576.851.48/.49.097.22:615.332(Tetracyclinum):575.133

EXPRESSION OF THE TETRACYCLINE RESISTANCE GENE OF PLASMIDS R6 AND RP4
IN ENTEROBACTERIACEAE

Moscow ANTIBIOTIKI in Russian Vol 24 No 4, Apr 79 pp 273-280 manuscript
received 13 Nov 78

GOL'DFARB, D. M. and KUPTSOVA, N. V., Institute of General Genetics,
USSR Academy of Sciences, Moscow

[Abstract] Investigations were conducted on the expression of plasmid R6 and RP4 tetracycline resistance genes in various members of the family Enterobacteriaceae, which demonstrated that the plasmid R6 gene was subject to less repression than the plasmid RP4 gene. Certain strains were found to be constitutive in tetracycline resistance (*E. coli* CSH-2/R6, *E. coli* DG-73/R6, *Hafnia* 614/R6, and *E. coli* Hfr CW 1895/R6), while others were either highly inducible (*Erwinia aroideae*/RP4), inducible (*E. coli* AE-1/RP4, *E. coli* AE-1/R6, *E. coli* Hfr CW 1895/RP4, *Proteus mirabilis* 146/R6, *P. mirabilis* 146/RP4, *Hafnia* 614/RP4, and *Erwinia aroideae*/R6), or noninducible (*E. coli* CSH-2/R6, *E. coli* DG-73/R6, *E. coli* DG-73/RP4, *E. coli* Hfr CW 1895/R6, *Hafnia* 614/R6). Figures 2; references 16: 1 Russian, 15 Western.

USSR UDC 615.339:576.858.095.383]:615.281.8.015.2:[615.225.2+577.164.2

EFFECTS OF BENDAZOL AND ASCORBIC ACID ON THE ANTIVIRAL ACTIVITY OF HUMAN INTERFERON IN TISSUE CULTURE

Moscow ANTIBIOTIKI in Russian Vol 24 No 4, Apr 79 pp 291-294 manuscript received 14 Nov 78

POVOLOTSKIY, YA. L. and KRIVOKHATSKAYA, L. D., Laboratory of Microbiology and Virology, Institute of Otolaryngology imeni A. I. Kolomiychenko, Ukrainian SSR Ministry of Health, Kiev

[Abstract] Tissue culture studies were conducted to evaluate the effects of human lymphocyte interferon against viruses in a system of primary human embryonic fibroblast culture infected with vesicular stomatitis virus. The results demonstrated that addition of bendazol (Dibazol) potentiated the effectiveness of interferon three-fold, while addition of ascorbic acid yielded 2.5-fold potentiation. Potentiation was seen only with human interferon in homologous cells. These findings suggest the potential for use of bendazol and ascorbic acid in the chemotherapy and prophylaxis of viral diseases. References 20: 6 Western, 14 Russian.

USSR

UDC 615.214.22:547.869.2].015.4:612.823.5

CHANGES IN POSTSYNAPTIC EXCITATION IN THE PRESENCE OF FENAZEPAM

Moscow BYULLETen' EKSPERIMENTAL'NOY BIOLOGII I MEDITSINY in Russian No 4, 1979 pp 317-319 manuscript received 23 Jun 78

BOGATSKIY, A. V., SERDYUK, V. V., NAZAROV, YE. I. and GOLOVENKO, N. YA., Laboratory of Psychotropic Agents, Odessa University imeni I. I. Mechnikov

[Abstract] Electrophysiologic studies were conducted to determine the mechanism of action of a new Soviet derivative of 1,4-benzodiazepine, fenazepam [sic]. Evaluation of the data obtained in studies on the effects of fenazepam on the subpharyngeal visceral ganglion of the garden snail *Helix aspersa* demonstrated that this class of drugs apparently acts through competitive inhibition of acetylcholine-induced, excitatory postsynaptic potentials. These studies were undertaken on the basis of steric similarities between fenazepam and acetylcholine and require independent confirmation. Figures 2; references 11: 4 Russian, 7 Western.

USSR

UDC 612.82-07:599.238

CHANGES IN THE METABOLISM OF NONHISTONE PROTEINS IN THE RAT BRAIN IN
RELATION TO ALTERED NERVOUS FUNCTION AND TRAINING

Kiev UKRAINSKIY BIOKHMICHESKIY ZHURNAL in Russian Vol 51 No 3, May/Jun
79 pp 246-249 manuscript received 28 Apr 78

LEVCHENKO, V. A., BENEVOLENSKIY, D. S. and DERGACHEV, V. V., 2nd Moscow
Medical Institute imeni N. I. Pirogov

[Abstract] Investigations were conducted on the metabolism of nonhistone proteins (NHP) in the brains of 150 g male white rats fully trained in maze tasks or semitrained. Based on the incorporation of ^{14}C -lysine, the data showed that brain histones consist of two fractions: one fraction with a relatively short half-life (5-10 days; NHP-1), and another with an 18-21 day lifetime (NHP-2). Further analyses demonstrated that the rate of metabolic turnover of NHP-1 was much more rapid in the trained and semitrained rats than in untrained control animals; while in the case of NHP-2 no significant differences were noted between control and experimental rats. Figures 1; references 19: 4 Russian, 15 Western.

USSR

UDC 612.111.3-06:612.273.1

ERYTHROPOIESIS INHIBITORS IN HUMAN BLOOD PLASMA IN HYPERBARIC HYPEROXIA

Moscow BYULLETEN' EKSPERIMENTAL'NOY BIOLOGII I MEDITSINY in Russian No 2,
1979 pp 122-123 manuscript received 11 Apr 78

VOYTKEVICH, V. I., VOLZHSKAYA, A. M. and KORCHINSKIY, L. A., Institute of
Physiology imeni I. P. Pavlov, USSR Academy of Sciences, Leningrad

[Abstract] Erythropoietic properties of plasma and composition of peripheral blood were studied in 10 healthy male students, 18-19 years of age, 1 day after they had been in a decompression-flow chamber at a pressure of 7.3 kg/cm², corresponding to a depth of 63 m. During the stay at this "depth," the subjects breathed a gas mixture of 25 percent oxygen, 15 percent helium and 60 percent nitrogen. The rise in the chamber pressure from 1 to 7.3 kg/cm² took 5 min (partial pressure of oxygen, $p\text{O}_2$, became 1.83 kg/cm², about 1400 mm Hg). The subjects were under these conditions 10 min. Then the chamber pressure was lowered to 2.6 kg/cm² and the subjects were switched to breathing nearly pure oxygen, 98 percent O_2 ($p\text{O}_2$ 2.5 kg/cm²). The entire "ascent" of the individuals from the 63 m "depth" to sea level lasted about 40 min. Pre-chamber residence erythropoietic

activity was 61 ± 29 standard units. One day after chamber residence this indicator was 5 ± 8 standard units. This change in erythropoietic properties of the plasma was due--one the one hand--to a cessation in erythropoietin production and, on the other, the appearance of erythropoietin inhibitors in the blood. References 14: 5 Russian, 9 Western.

USSR

UDC 616.746-007.23-073.7

RECOVERY OF ELECTRICAL ACTIVITY BY THE ABDOMINAL WALL MUSCLES AFTER PROLONGED ATROPHY

Moscow BYULLETEN' EKSPERIMENTAL'NOY BIOLOGII I MEDITSINY in Russian No 4, 1979 pp 302-304 manuscript received 21 Jun 78

DAUROVA, T. T., ZHIGALKINA, I. YA. and BELYAYEV, V. I., Institute of Surgery imeni A. V. Vishnevskiy, USSR Academy of Medical Sciences, Moscow

[Abstract] EMG investigations on patients with large abdominal hernias showed that amplitudes on the affected side were reduced to 30-100 μ V, while at the unaffected side they remained at the normal level of 300-900 μ V during elevation of the feet. Autoplastic and autoalloplastic (Dacron) surgical repairs resulted in restoration of electrical function with peaks reaching normal values in the majority of patients. Comparative studies showed that recovery from atrophy of the abdominal muscles was greater in patients with autoalloplasty, presumably because of less stress on the involved musculature after repair. Figures 1; references 9: 5 Russian, 4 Western.

USSR

UDC 612.014.423

OPERATIONAL AMPLIFIER WITH A HIGH-VOLTAGE OUTPUT

Kiev FIZIOLOGICHESKIY ZHURNAL in Russian No 2, Mar/Apr 79 pp 215-216 manuscript received 9 Nov 77

BURYY, V. A., Department of Neuromuscular Physiology, Institute of Physiology imeni A. A. Bogomolets, UkrSSR Academy of Sciences, Kiev

[Abstract] Integrated-circuit operational amplifiers have become widely used in biological research, but frequently their maximum output voltage

is insufficient for many practical purposes. The author suggests an amplifier based on the K1UT401B microcircuit, the output of which is connected to a voltage amplifier with a gain factor of 20. The amplifier can generate an output signal with a maximum voltage of 100 V with minimum distortion, and 0 voltage when there is no input signal. A schematic diagram of the device is presented. Figure 1; references 5 (Russian).

USSR

UDC 612.745.5

CHANGE IN THE CALORIC EQUIVALENT OF WORK UPON FATIGUE OF AN ISOLATED SKELETAL MUSCLE

Kiev FIZIOLOGICHESKIY ZHURNAL in Russian No 2, Mar/Apr 79 pp 204-207
manuscript received 2 Mar 78

PRUDNIKOV, V. M. and BAKHAREV, A. M., Department of Normal Physiology, Kiev Medical Institute

[Abstract] An estimate and an analysis are made of the caloric equivalent of the work of a deeply fatigued muscle. Isolated frog muscles were stimulated with rectangular electric pulses 1 ms in length, 5 V in height. The experiment showed that repeated stimulation of deeply fatigued muscles results in a significant increase in the caloric equivalent of work under aerobic conditions. The increase in the coefficient upon repeated stimulation is practically unrelated to the oxidative phosphorylation cycle. A possible cause is the alteration of electromechanical resistance, resulting in liberation of significant quantities of heat of activation with little change in the amplitude of the action potential. Figure 1; references 14: 8 Russian, 6 Western.

USSR

UDC 631.461.5

BIOLOGICAL NITROGEN IN SOVIET AGRICULTURE

Moscow VESTNIK SEL'SKOKHOZYAYSTVENNOY NAUKI in Russian No 4, Apr 79
pp 18-22

MISHUSTIN, YE. N., academician

[Abstract] A brief review is provided of the role of "biological" (fixed) nitrogen in agriculture in the USSR in meeting the protein needs of the Soviet population. The manner of nitrogen fixation is covered succinctly, including the unsubstantiated claims of M. I. Volskiy in the 1960's on human nitrogen fixation, as well as the endeavors of the Soviet state in promoting research in this direction. A growing area of research in the USSR centers on the role of free-living soil microbes that fix nitrogen, in addition to studies on the symbiotic microbe-leguminous plant relationships.

USSR

UDC 631.51+633.11+631.445.4

EFFECTIVENESS OF PLOWING THE CHERNOZEM WITHOUT MOLDBOARDS FOR WINTER WHEAT

Leningrad VESTNIK SEL'SKOKHOZYAYSTVENNOY NAUKI in Russian No 4, Apr 79
pp 23-32

MORGUN, F. T., candidate of agricultural sciences, hero of socialist labor and First Secretary of the Poltava Oblast Committee of the Communist Party of the Ukraine, and FISYUNOV, A. V., doctor of agricultural sciences, Poltava Agricultural Institute

[Abstract] Data are presented for the conditions under which plowing without moldboards was employed in the chernozem of the Poltava Oblast for winter wheat following peas for grain, corn for silage, and other predecessor crops. The results showed that such practices in relatively dry years improved the condition of the soil and increased wheat harvests by an average of 2.8 quintals/hectare, resulting in additional income of 11.0 rubles per hectare. In years with adequate precipitation the harvests were equivalent to those obtained with regular plowing. Highest yields were seen when plowing sans moldboards was accompanied by spraying with 2,4-D for weeds.

TECHNOLOGICAL REQUIREMENTS OF INDUSTRY FOR THE SUNFLOWER

Leningrad VESTNIK SEL'SKOKHOZYAYSTVENNOY NAUKI in Russian No 4, Apr 79
pp 33-36

BOZHKO, YE. F., candidate of agricultural sciences, DEMENTIY, V. A.,
candidate of technical sciences (CTS), Kharkov Branch, All-Union
Scientific Research Institute of Lipids and KLYUCHKIN, V. V., (CTS),
All-Union Scientific Research Institute of Lipids

[Abstract] Certain technical considerations are discussed to promote improvements in the Soviet varieties of sunflowers. At the present time the high fat content of sunflower seeds (45.71%) makes them particularly susceptible to mycotic diseases, spoilage, and other forms of loss connected with processing difficulties and storage. There is need, therefore, for timely implementation of new technology in the processing of sunflower seeds and oils, and in the breeding of new varieties of plants with improved biological characteristics. Tables 2.

STOOLING AND PROTEIN CONTENT OF WINTER WHEAT

Leningrad VESTNIK SEL'SKOKHOZYAYSTVENNOY NAUKI in Russian No 4, Apr 79
pp 37-40

KODANEV, I. M., doctor of agricultural sciences and IL'INA, A. F.,
Gor'kly Agricultural Institute

[Abstract] Studies were conducted on the relationship between the extent of stooling and protein concentration of Mironovka 808 winter wheat. Statistical evaluation of the data demonstrated that single stem plants generally possess less grain protein than stooling plants ($t = 3.08$).

MORPHOPHYSIOLOGICAL ANALYSIS OF WINTER WHEAT PLANTS FOR ASSESSMENT OF PRODUCTIVITY

Leningrad VESTNIK SEL'SKOKHOZYAYSTVENNOY NAUKI in Russian No 4, Apr 79
pp 40-45

KUPERMAN, F. M., doctor of biological sciences, MURASHEV, V. V., candidate of biological sciences and BYKOVA, M. S., Moscow Order of Lenin and of the Red Banner of Labor State University imeni M. V. Lomonosov

[Abstract] Details are provided for microscopic examination of winter wheat vegetative cones and terminal shoots during winter and early spring in order to predict potential losses due to severe frosts and to estimate harvests. Experience has demonstrated that such samples are best obtained when the temperature is above -20°C to avoid plant damage during digging. Studies conducted with several varieties of winter wheat in the Moscow Oblast have substantiated the soundness of such an approach which relies on visual and microscopic examination of the vegetative cones of the terminal shoots and of the leaves. In the case of Mironovka 808 and Odessa 51 winter wheats, the number of synchronously developing shoots is directly related to high harvests. Figures 4.

PROTEIN COMPLEX OF TRITICALE

Leningrad VESTNIK SEL'SKOKHOZYAYSTVENNOY NAUKI in Russian No 4, Apr 79
pp 46-51

PLESHKOV, B. P., doctor of biological sciences, KUZNETSOVA, N. K., Moscow Order of Lenin and of the Red Banner of Labor Agricultural Academy imeni K. A. Timiryazev; SHULYNDIN, A. F., doctor of agricultural sciences, Ukrainian Scientific Research Institute of Plant Breeding, Selection, and Genetics imeni V. Ya. Yur'yev, and GRUZDEV, L. G., candidate of biological sciences, Central Institute of Agrochemical Services for Agriculture

[Abstract] The protein composition and amino acid components of 9 Soviet varieties of Triticale (AD 206, AD196, AD 209, AD 201, AD 332, AD 333, AD 257, AD 1, AD bezostaya) were compared with data obtained for Mironovka 808 wheat and Kharkov 55 rye. The protein concentration of triticale

grain ranged from 14.4-16.7%, which was 2.6-4.9% higher than rye grain and 1.5-3.8% higher than wheat grain. Fractional protein composition of the triticale was intermediate between that of wheat and rye, but certain varieties were quite similar to wheat in terms of protein pattern. In addition, total amino acid composition was similar to that of wheat and the quantities of essential amino acids exceeded both wheat and rye. Figures 2; references 19: 11 Russian, 8 Western.

USSR

UDC 631.67+633.18

DECREASING WATER REQUIREMENT FOR RICE CULTIVATION

Leningrad VESTNIK SEL'SKOKHOZYAYSTVENNOY NAUKI in Russian No 4, Apr 79
pp 99-101

KOGAY, M. T., candidate of agricultural sciences, Uzbek Scientific
Research Institute of Rice

[Abstract] Studies were conducted in the Chirchik valley in the Tashkent Oblast with Uzbek 5 and UzROS 7-13 rice varieties to determine whether irrigation requirements could be modified from those commonly employed in rice cultivation. The results showed that inundation of the rice fields during the initial and final phases of development could be curtailed, with the decrease in the use of water of irrigation amounting to 7-23% without adverse effects on the harvest. The resultant decrease of soil moisture by 3-4% during "milky" [sic] grain maturation facilitated harvesting. References 15 (Russian).

USSR/CANADA

UDC 632.782+632.938.1:633.15

POSSIBILITIES FOR CONTROL OF THE MULTIPLICATION OF THE EUROPEAN CORN BORER *OSTRINIA NUBILALIS* HBN. (LEPIDOPTERA, PYRALIDAE) IN THE USSR AND CANADA THROUGH CULTIVATION OF RESISTANT CORN LINES

Leningrad ENTOMOLOGICHESKOYE OBOZRENIYE in Russian Vol 56 No 3, 1979
pp 3-14

SHAPIRO, I. D., PEREVERZEV, D. S. and HUDON, M., All-Union Scientific Research Institute of Plant Protection, Leningrad, USSR, and the Agricultural Experimental Station, St. Jean, Quebec, Canada

[Abstract] A review is presented of a cooperative study conducted by the USSR and Canada on the control of the European corn borer (*Ostrinia nubilalis*) through cultivation of resistant corn lines in Quebec and the Kuban'. Trials conducted in the 1969-1972 period demonstrated that multiplication of this pest on susceptible and resistant corn lines in the USSR was 10-fold less on the former, but only 1.5-fold less in Canada. This difference in reproductive efficiency on the same corn lines was ascribed to differences in a variety of geoeological factors, and points to the need for careful evaluation of agricultural and other factors that must be considered before successful control of crop pests can be undertaken through selection of resistant crops. Figures 2; references 23: 1 Serbian, 16 Russian, 6 Western.

USSR

UDC 575.24:576.312.32:633.11

CHEMICAL MUTAGENESIS IN RELATION TO PHYSIOLOGIC STATUS OF WHEAT GRAIN DURING TREATMENT

Tallinn IZVESTIYA AKADEMII NAUK ESTONSKOY SSR in Russian Vol 28 No 2, 1979 pp 122-127 manuscript received 18 Aug 78

PRIYLINN, O., SHIFRIN, YU., SHNAYDER, T. and DOROKHOVA, T., Institute of Experimental Biology, Estonian SSR Academy of Sciences

[Abstract] The consequences of seed exposure to chemical mutagens were investigated with Leningradka and Sappo spring wheats. Air-dried and presoaked (16 h) seeds were exposed to different concentrations of N-nitroso-N-methylurea (NMU; 0.01% and 0.02% concentrations) or to 1,4-bis(diazoacetyl)butane (DAB; 0.05%, 0.1%, or 0.15% concentrations) for 12 h at 21°C, pH 5.8, washed for 1.5 h and then planted under laboratory and field conditions. The results showed that presoaking potentiated the effects of the mutagens and that NMU was much more

deleterious than DAB. Pretreatment with 0.01% NMU lowered germination to 87% (control: 95%) for Leningradka wheat, and to 74% for Sappo (Control: 80.5%), with the resultant plants dying in 6-7 weeks. 0.01% NMU also depressed germination, slowed the rate of plant development, increased the frequency of deformed and sterile spikes, and of chromosomal aberrations in the meristems of primary roots. In general, Leningradka was more susceptible than Sappo wheat. Moderate stimulatory effects of DAB were ascribed to depression of spontaneous mutations since this agent induces primarily gene mutations without gross chromosomal damage. Figures 2; references 10: 8 Russian, 2 Western.

USSR

UDC 616.613-003.7-092:613.2(470.344)

NUTRITIONAL STATUS IN THE CHUVASH ASSR IN RELATION TO ENDEMIC UROLITHIASIS

Moscow VOPROSY PITANIYA in Russian No 2, 1979 pp 67-71 manuscript received 14 Feb 78

SUSLIKOV, V. L., SAYKINA, M. K., LEVCHENKO, M. A. and BELOKON', R. F., Chuvash University imeni I. N. Ul'yanov, Cheboksary

[Abstract] Nutritional profiles were obtained in the Chuvash ASSR in areas endemic for urolithiasis (Poretskiy and Alatyrskiy rayons) and in control regions (Yantikovski and Kanashski rayons). The results showed that the diets in both the endemic and nonendemic areas were high in carbohydrates and low in fats and proteins (particularly animal proteins). Statistically significant differences, however, were noted in the intake of calcium, silicon, manganese, and cadmium, which was higher in the endemic regions. The difference was particularly significant in the case of silicon (P 0.001; 45.0 mg/day in endemic area vs. 10.0 mg/day in nonendemic area), although urinary secretion of silicon was identical in both population groups. These preliminary findings indicate that silicon may have an etiologic role in the development of urolithiasis in the regions in question, in conjunction with the other elements. Figures 1; references 20: 15 Russian, 5 Western.

USSR

UDC 613.2:[615.277.4:547.495.9

CADMIUM IN FOOD (TOXICOLOGY, DISTRIBUTION, AND PUBLIC HEALTH MONITORING)

Moscow VOPROSY PITANIYA in Russian No 2, Mar/Apr 79 pp 3-12 manuscript received 20 Jul 78

NESTERIN, M. F. and KONYSHEV, V. A., Institute of Nutrition, USSR Academy of Medical Sciences, Moscow

[Abstract] A survey, based on international literature, is provided on the problem of cadmium in food, the resultant toxicology due to excess intake of cadmium, monitoring measures, and newer data on chemical means of counteracting its toxicity. At present, the best documented cases of cadmium toxicity consist of studies on Itai-Itai disease in Japan and certain outbreaks in France during World War II. The system toxicity exerted by cadmium is particularly evident in testicular changes, it has been implicated in carcinogenesis or cocarcinogenesis, and is known to induce chromosomal damage. Consideration is also given to protective substances such as phenobarbital, selenite, 2,3-mercaptopropanol, cysteine, ascorbic acid, and zinc, among others. Primary sources of food cadmium are cereals, liver, and seafood. References 103: 1 Bulgarian, 2 Polish, 11 Russian, 92 Western.

USSR

UDC 581.5:632.118.3

EFFECTS OF THE SEASON OF AERIAL POLLUTION OF AGRICULTURAL PLANTS ON CROP LEVELS OF ^{89}Sr

Sverdlovsk *Ekologiya* in Russian No 2, Mar/Apr 79 pp 53-57 manuscript received 19 May 78

ARCHIPOV, N. P. and FEVRALOVA, L. T.

[Abstract] Experimental studies were conducted on the uptake of ^{89}Sr by corn, wheat, and potatoes when exposed 10-70 days before harvesting to aerial (water spray) contamination with the radioisotope (0.3 liters per m^2) in the following representative Soviet zones: central taiga, southern taiga, forest-steppe, steppe, desert, and subtropical semidesert. The results showed that in the case of corn green mass and wheat grain, ^{89}Sr accumulation increased when contamination took place close to the harvest time, while in the case of potato tubers the reverse relationship prevailed. Further analyses revealed that, for wheat straw, 6.1% of the accumulated ^{89}Sr was due to natural conditions, 75.0% to the time of contamination, 10.9% to interaction between the natural conditions and time of contamination, and 8.0% was determined by chance factors. The corresponding figures for corn and potatoes were, respectively, 17.1%, 47.1%, 28.7%, 7.1%, and 58.6%, 21.3%, 15.9%, 4.2%. Figures 1; references 11: 7 Russian, 4 Western.

USSR

UDC 615.357.379.015.23:615.357.453

EFFECTS OF HYDROCORTISONE AND INSULIN ON CHANGES IN OXIDATIVE PHOSPHORYLATION INDUCED BY NEUTRON IRRADIATION

Kiev *UKRAINSKIY BIOKHIMICHESKIY ZHURNAL* in Russian Vol 51 No 3, May/Jun 79 pp 226-230 manuscript received 16 May 78

SUTKOVY, D. A., ALFEROV, A. N., BARABOV, V. A. and LETOV, V. N., Kiev Scientific Research Roentgenoradiologic and Oncologic Institute, Ukrainian SSR Ministry of Health, Kiev

[Abstract] Radiobiologic studies with the effects of fast neutrons on 150-160 g male rats showed that fractionated doses (50 rads at 7 day interval) inhibited to a significant extent oxidative phosphorylation (OP) by liver mitochondria, depressed serum chemiluminescence somewhat, and elevated plasma levels of 11-hydroxycorticosteroids by 65%. Administration of hydrocortisone (1.25 mg/100 g, ip, on the 1st to the 6th day

after primary irradiation and on the 1st-3rd day after second irradiation) had no significant effect on serum chemiluminescence, caused a further increase in 11-hydroxycorticosteroids, and potentiated OP depression. Insulin administration (0.2 units/100 g; same schedule as hydrocortisone) potentiated OP and serum chemiluminescence, while combined administration of insulin and hydrocortisone potentiated OP to a lesser degree than seen with insulin alone but increased serum chemiluminescence to an even greater extent. In general, metabolic changes seen with fractionated neutron irradiation were less pronounced than those induced by a single 100 rad dose of neutrons. The results showed that administration of exogenous hydrocortisone potentiated the metabolic perturbations induced by neutron irradiation, while insulin counteracted them to some extent. References 12: 1 Ukrainian, 8 Russian, 3 Western.

USSR

UDC 616.33-002.44-053.2-085.874.2:613.281

USE OF THE PROTEIN "ENPIT" PREPARATION IN COMBINED THERAPY OF PEPTIC
ULCER IN CHILDREN

Moscow VOPROSY PITANIYA in Russian No 2, Mar/Apr 79 pp 21-23 manuscript
received 30 Jun 78

MAKAROVA, I. B., Laboratory of Diet Therapy, Gor'kiy Scientific Research
Institute of Pediatrics, RSFSR Ministry of Health, and the Department
of Nutrition for Sick Children, Institute of Nutrition, USSR Academy of
Medical Sciences, Moscow

[Abstract] Clinical trials were conducted on the efficacy of a high-
protein supplement preparation, Enpit, which possesses antacid properties
and is enriched in vitamins and minerals, in the treatment of pediatric
patients with peptic ulcer. (Enpit is described as based on cow's milk
protein, supplemented with sugar, cream, refined vegetable oil, fat-soluble
and water-soluble vitamins and iron glycerophosphate. When supplemented
with sodium and potassium citrates, it is said to facilitate digestion
of the protein for children). The results showed that administration of
200 g/day as a second breakfast for 30-35 days to 8-14 year olds resulted
in subjective and objective improvements, including much earlier cessation
of pain and healing of the ulcer, as well as restoration of normal A/G
ratio. It appears that Enpit can be recommended for the treatment of
pediatric cases of peptic ulcer. Figures 1; references 14: 11 Russian,
3 Western.

USSR UDC 615.874.2.03:]616.899-06:616.633.589.4].07:[577.164+577.164.2]
.087.4

DIETARY SUPPLY OF VITAMINS OF THE B GROUP AND ASCORBIC ACID IN PATIENTS
WITH PHENYLKETONURIA

Moscow VOPROSY PITANIYA in Russian No 2, Mar/Apr 79 pp 24-26 manuscript
received 26 Oct 77

KOPYLOVA, N. V., RYBAKOVA, YE. P. and TARABAN'KO, V. M., Department of
Nutrition for Sick Children, the Laboratory of Vitamins, Institute of
Nutrition, USSR Academy of Medical Sciences, Moscow

[Abstract] Studies on 78 phenylketonurics, 1 month to 3 years old,
revealed marked vitamin deficiencies (thiamine, riboflavin, niacin,
ascorbic acid), and led to studies on special vitamin-enriched diets

designed to correct these deficiencies. Special diets low in proteins and supplemented with the vitamins in question did not lead to clinical improvements, and pointed to the need for supplementary vitamin preparations. Use of the latter led to normal urinary levels of thiamine, and above normal levels of riboflavin, ascorbic acid, and pyridoxine. This study underlines the need for further improvements in the diets of phenylketonuric children to assure adequate vitamin supplies. References 7: 2 Russian, 5 Western.

USSR

UDC 615.916'181.5.085.874.2:664.292

EVALUATION OF PECTIN WITH LOW ESTERIFICATION NUMBER IN PROPHYLAXIS OF LEAD POISONING

Moscow VOPROSY PITANIYA in Russian No 2, 1979 pp 65-67 manuscript received 1 Mar 78

BONDAREV, G. I., ANISOVA, A. A., ALEKSEYEVA, T. YE. and SYZRANTSEV, YU. K., Laboratory of Preventive Nutrition, Institute of Nutrition, USSR Academy of Medical Sciences, Moscow

[Abstract] Experimental lead poisoning studies were conducted on 120-150 g male rats to evaluate the relative therapeutic effectiveness of pectin preparations with different degrees of esterification (26% and 32%). The results showed that daily administration of 6 mg/day (5 days/week) of lead acetate for 1.5 months in conjunction with 36 or 72 mg/rat/day of 26% pectin or of 216 or 432 mg/rat/day of 32% pectin resulted in a statistically significant greater elimination of Pb via the enteric route with 432 mg/rat/day 32% pectin regimen. In addition, the mortality figure for the 32% pectin regimen was 95.2%, and for the 26% pectin 81-87.6%, in relation to the duration of the experiment; in addition, the 432 mg/rat/day 32% pectin regimen showed the greatest inhibition of lead accumulation in the bones. Studies on pectin toxicity demonstrated that both 26% and 32% pectins induced gastrointestinal disturbances as indicated by loose stools. Figures 1; references 1 (Russian).

USSR

UDC 616.21:615.832.9

NEW ASPECTS OF CRYOSURGERY IN OTORHINOLARYNGOLOGY

Kiev ZHURNAL USHNYKH, NOSOVYKH, I GORLOVYKH BOLEZNEY in Russian No 2, Mar/Apr 79 pp 41-46

POGOSOV, V. S., professor, and candidate of medical sciences, TARLYCHEVA, L. S., ANTONIV, V. F. and RUDNYA, P. G., Laryngootorhinologic Clinic, Central Order of Lenin Institute for the Advanced Training of Physicians, City Clinical Hospital No 67, and City Clinical Hospital No 40

[Abstract] A review is provided of the efficacy of cryosurgery on the basis of 1846 cases of otolaryngologic problems. The results showed that application of liquid oxygen and nitrogen offers noncontact freezing of a limited area under relatively safe conditions without cardiovascular complications, reduces surgical risk to a minimum, diminishes postoperative complications, and is especially suited for patients with contraindications for surgical interventions. This technique has been particularly useful in the treatment of glomic tumors of the ear, nose, and throat, as well as in the management of patients with Reinke's laryngitis. Figures 4; references 7 (Russian).

USSR

UDC 616.211-006.5-03.81:615.832.9

EFFECTS OF CRYOSURGERY ON SEROTONIN AND HISTAMINE METABOLISM IN PATIENTS WITH CHRONIC POLYPOUS SINUSITIS

Kiev ZHURNAL USHNYKH, NOSOVYKH, I GORLOVYKH BOLEZNEY in Russian No 2, Mar/Apr 79 pp 46-50

TSYRUL'NIKOVA, L. G., candidate of chemical sciences, and ZAGORYANSKAYA, M. YE., candidate of medical sciences, Moscow Scientific Research Institute of the Ear, Throat, and Nose, Russian SFSR Ministry of Health

[Abstract] The effects of cryosurgical treatment of 50 cases with chronic polyposus sinusitis were evaluated in terms of serotonin and histamine metabolism prior to and one month after the procedure. The results showed that blood serotonin levels before and after the procedure were significantly depressed (0.064 and 0.085 $\mu\text{g/ml}$, respectively) in comparison with control values (0.119 $\mu\text{g/ml}$), whereas blood levels of histamine were significantly elevated (10.8 $\mu\text{g\%}$, 11.4 $\mu\text{g\%}$, and 7.4 $\mu\text{g\%}$, respectively). There were no significant differences between the patients and control subjects in terms of blood activities of histaminase or urinary levels

of 5-HIAA. Thus, cryosurgery induced a limited increase in the serotonin level without altering the histamine levels. The findings were interpreted to suggest that cryosurgery did not alter the allergic state of the patients and that local cryosurgery may be used in combination with antihistamines. References 20: 12 Russian, 8 Western.

USSR

UDC 616.12-008.331.1-085.835.14-036.8:616.1-008.3-072.7

EFFECT OF INTERRUPTED HIGH-ALTITUDE BAROTHERAPY ON HEMODYNAMICS IN PATIENTS WITH ARTERIAL HYPERTENSION

Moscow KARDIOLOGIYA in Russian No 1, 1979 pp 107-108 manuscript received 29 Sep 77

KATYUKHIN, V. N., SHLYAKHTO, YE. V. and SHUYSKAYA, G. A., Department of Faculty Therapy (head: Professor V. A. Almazov), Department of Barotherapy (head: Doctor of Medical Sciences N. V. Tyagin), and Department of Experimental Physiology and Pharmacology of the Central Scientific Research Laboratory (head: Doctor of Medical Sciences V. A. Tsyrlin) of the First Leningrad Medical Institute imeni I. P. Pavlov

[Abstract] Twelve patients with arterial hypertension, aged 23 to 49, underwent barotherapeutic conditioning: 12-14 sessions of 25 min each at a simulated elevation of 2000-3000 m, five times a week. Ten of the 12 patients had stage I-II hypertension and two had arterial hypertension of renal etiology. Before the study no patient had been receiving hypertension therapy on a regular basis, if at all. Most patients had a history of higher arterial pressure of no longer than 5 years. After the barotherapy, ten patients showed lowered arterial pressure (from 152.2 ± 5.1 down to 132.5 ± 5.1 mm Hg, maximum pressure; and from 93.3 ± 3.1 to 83.3 ± 3.3 mm Hg, minimum). Two patients had no pressure change. Mechanisms underlying the effect of high-altitude hypoxia on the hemodynamic indicators of patients with arterial hypertension can include: 1) emission of vasodilators like adenosine, adenosine monophosphate, prostaglandin E_1 and others. By dilating the vessels of the lesser and greater circulatory systems, these vasodilators lower the total peripheral resistance to flow. This reduction is accompanied by a slower rate of propagation of a pulse wave along vessels of the muscular and elastic types. The reduction in total peripheral resistance is accompanied by faster blood flow along the arm-ear section and by a shortening in the time for a complete circuit of the circulatory system. In turn, this leads to greater venous return of blood. Some significance in the effect of interrupted high-altitude barotherapy on hemodynamics in the group of patients studied lies in the change in depolarization of cellular membranes with the inflow of calcium ions into

the cell. This inflow leads to higher tonicity of the myofibrils. All the changes occurring in the myocardium can promote higher cardiac contractile function. References 10: 4 Russian, 6 Western.

USSR

UDC 615.472:615.814.1+615.814-7

THERMAL MECHANISM OF ACTION OF THE ACUPUNCTURE NEEDLE AND A PHYSICAL MODEL OF IT

Kiev VRACHEBNOYE DELO in Russian No 4, Apr 79 pp 92-96

ROMODANOV, A. P., academician, USSR Academy of Medical Sciences, BOGDANOV, G. B., doctor of technical sciences, and LYASHCHENKO, D. S., candidate of medical sciences, Kiev Scientific Research Institute of Neurosurgery

[Abstract] This is a continuation of an earlier study which dealt with the pattern of electrothermal bioenergetic transformations at biologically active points (BAP) of the skin during electropuncture and acupuncture, which revealed the electrothermal mechanism of the negative differential bioresistance of the human skin and pointed to a thermal nature of the physical effect of the acupuncture needle (Romodanov, et al., VRACH. DELO, No 10, 1977, p 31). Now the thermal mechanism of action of the acupuncture needle is further investigated. The pattern of distribution of thermal fields and radiation temperature of the skin before and after the application of acupuncture needles or electrical current to BAP on the skin of the ear conchs was investigated with the aid of an English-made Runk thermovision set with a temperature sensitivity correct to 0.2°C. The study was performed on 7 males and 2 females 27-50 years old. A 45 mm long steel needle was inserted to a depth of 10-25 mm in the ear conchs. Electropuncture was performed for 2 min with meander-type rectangular pulses (repetition frequency 14 Hz, amperage 25 μ A). It is established that the needle and electrical current produce opposite effects on BAP: the needle cools while the electrical current heats. On this basis the physical model of the thermal mechanism of action of the acupuncture needle is represented by a bioelectrical BAP circuit forming an electrothermal excitation cell in which variations in the physicochemical parameters of the ambient medium can be transformed into variations in temperature. It thus is clear that the acupuncture needle affects the thermal homeostasis of the body. Seen from the thermodynamic viewpoint, the needle may be regarded as a system in contact with two non-equilibrium heat sinks--the human body and the ambient environment. Since, moreover, an electrical potential arises in the needle after it is inserted in a tissue, and that potential varies with the varying temperature of the needle (thus generating electrical signals that are from the standpoint of energy balance adequate for their analysis by the nervous system), the acupuncture needle is a more intricate medical instrument than is conventionally

assumed. It can trigger not only the higher nervous regulatory mechanisms but also, by modifying the thermal homeostasis, guide the performance of the molecular computers in cells in accordance with the variations in the energy fields of the external environment. Further, it provokes systemic reactions providing the body with the energy it needs to restore its thermal homeostasis. Figures 4; references 12: 8 Russian, 4 Western [in Russian translation].

USSR

UDC 616.24-009.4-085+615.835.4

SUCCESSFUL TREATMENT OF ACUTE RESPIRATORY OXYGEN INSUFFICIENCY UNDER HIGH PRESSURE

Kiev VRACHEBNOYE DELO in Russian No 4, Apr 79 pp 65-66

YENIN, V. M. and KRYSYUK, L. V., Nikolayev, TB Dispensary, Infirmary of the Black Sea Shipyard

[Abstract] A case of successful use of hyperbaric oxygenation (HBO) in the treatment of severe post-influenzal pneumonia is described. The patient, 57 years old, was admitted on 20 Jan 77 with diagnosis of post-influenzal dextrolateral lobar pneumonia. On 24 Jan 77 he developed distinct symptoms of hypoxia along with a psychosis. Between 24 and 28 Jan 77 the patient was administered 18 HBO sessions with an overall duration of 46 hr 40 min under pressures mostly ranging at 0.2-0.3 atm but sometimes reaching 2 atm, in an English-made Vickers pressure chamber. This treatment resulted in growing improvement of the patient's condition which was further promoted by transfusion therapy to maintain the water-electrolyte, energy, and vitamin balance. The patient was discharged in satisfactory condition on the 5th day. The possibility of varying the mode of HBO in the direction of a lower oxygen pressure, at which normal oxygenation is assured, improves the conditions of diffusion of gases through the alveolar-capillary membrane in the treatment of pneumonia. Hyperbaric oxygenation provides the necessary conditions for complex therapy intended to maintain the function of the cardiovascular system, normalization of the drainage role of the bronchi, and intensive anti-bacterial therapy.

CZECHOSLOVAKIA

SURVEY OF SENSITIVITY OF SELECTED BACTERIAL SPECIES TO ANTIBIOTICS IN
THE PILSEN TEACHING HOSPITAL (1964-1976)

Prague ČESKOSLOVENSKA EPIDEMIOLOGIE MIKROBIOLOGIE IMUNOLOGIE in Czech
Vol 27 No 6, Dec 78 pp 342-354 manuscript received 29 Jun 78

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[Abstract] During the period 1964 to 1976 137,121 strains of bacteria
belonging to 15 different species, genera, and biotypes were isolated
from patients treated at the Pilsen Teaching Hospital. The strains
showed different sensitivities to various antibiotics and chemotherapeutics
tested for their effect against these bacterial strains. The standard
disc plate method was used in the tests. The main strains found during
the investigation were: *Staphylococcus aureus*, *Streptococcus viridans*,
Streptococcus hemolyticus, *Streptococcus faecalis*, *Streptococcus pneumoniae*,
Escherichia coli, *Enterobacter* sp., *Citrobacter* sp., *Salmonellas*, *Shigella*
flexneri, *Shigella sonnei*, *Proteus* bacteria, *Providencia*, *Haemophilis*
bacteria and *Pseudomonas aeruginosa*. Figures 16; references 2 (Czech).

USSR

UDC 616.895.1-085

INFLUENCE OF LITHIUM CARBONATE ON THE BIOELECTRIC ACTIVITY OF THE BRAIN, VASCULAR-AUTONOMIC TONUS AND METABOLISM OF BIOGENIC AMINES IN DEPRESSIVE PATIENTS

Kiev FIZIOLOGICHESKIY ZHURNAL in Russian No 2, Mar/Apr 79 pp 154-163
manuscript received 3 Nov 77

USHERENKO, L. S. and SINITSKIY, V. N., Department of Pathology of Higher Nervous Activity, Institute of Physiology imeni A. A. Bogomoletz, Kiev

[Abstract] Considering the significant role of the limbic-reticular complex in processes of self-regulation of the body, study of the anti-depressive effective of lithium requires a study of the regulation relationships between the central, vegetative and humeral processes. The authors studied the influence of one-time peroral administration of lithium carbonate on the clinical state, bioelectric activity of the brain, peripheral vascular-autonomic tonus and metabolism of biogenic amines (catecholamines and serotonin) in depressive patients. Nineteen patients from 20-40 years of age were studied, with various forms of depression, including five with endogenous (circular) depression, three with psychogenic depression and eleven with somatogenic depression, plus eleven healthy persons as a control. The results of the study showed that lithium carbonate, administered once perorally, causes a change in the bioelectric activity of the brain, in peripheral vascular-autonomic tonus and in metabolism of biogenic amines in depressive patients. In patients with circular depression, there is a correlation between the EEG, autonomic and vascular tonus, catecholamine (CA) metabolism in the initial status of the body. Even one-time administration of lithium carbonate in patients with clear affective stress and anxious phenomena (type I EEG) causes a change in the cerebral-somatic processes and mental outlook in the direction of brief normalization. In patients with psychogenic and, particularly, somatogenic depression, various changes in the indices of the functional status of the body were observed, manifested as disagreement between the shifts in bioelectric activity of the brain, vascular and autonomic tonus, content of CA in the blood and urine and clinical picture. References 31: 10 Russian, 21 Western.

USSR

UDC 612.821:616.895

CHARACTERISTICS OF MOBILITY OF PRIMARY NERVE PROCESSES AND EFFICIENCY
OF CORTICAL BRAIN CELLS IN DEPRESSIVE PATIENTS

Kiev FIZIOLOGICHESKIY ZHURNAL in Russian No 2, Mar/Apr 79 pp 139-146
manuscript received 16 Feb 78

KRYZHANOVSKAYA, L. A., Department of Pathology of Higher Nervous Activity,
Institute of Physiology imeni A. A. Bogomolets, UkSSR Academy of Sciences,
Kiev

[Abstract] A comparative clinical-pathophysiological study is presented of patients suffering from circular and presenile depression, including a study of the peculiarities of the functional mobility of the primary nerve processes and the efficiency of cortical cells. This study was performed in parallel with a careful clinical examination of the patients, studies of the condition of the cerebral vessels and the excretion of catecholamines. The study was conducted on 99 women 45-60 years of age with depressive syndrome (55 with circular depression, 44 with presenile depression), with a control group of 18 healthy women in the same age bracket. The results produced indicate a significant reduction in the mobility of the primary nerve processes in patients with presenile depression, in comparison to the control group; in patients with circular depression, mobility was also decreased, though to a lesser extent. A decrease in mobility and a tendency toward a decrease in efficiency were observed in patients with circular depression and the alarm-depressive syndrome. References 28: 24 Russian, 4 Western.

USSR

UDC 612.766:1

EMOTIONAL-VOLITIONAL CHARACTERISTICS OF MINERS

Kiev FIZIOLOGICHESKIY ZHURNAL in Russian No 2, Mar/Apr 79 pp 182-186
manuscript received 31 Oct 77

OLEYNIKOV, V. A., Department of Labor Psychology, Central Institute of
Economics and Scientific-Technical Information of the Coal Industry,
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[Abstract] The emotional-volitional characteristics of miners were tested in pain-tolerance experiments, static force exertion experiments, and experiments involving maintenance of a fixed pose, with instructions to report the first "sense of fatigue" to the investigator. The studies

showed that the pain thresholds recorded for mining machine operators, support installers and journeyman miners differed significantly. Machine operators were most pain tolerant, showed the least pulse-rate reaction to maintenance of the fixed pose and the highest evaluation of stability of behavior in an emergency situation. References 12 (Russian).

USSR

UDC 615.214.015.4:591.552:599.323.4

EFFECTS OF AMPHETAMINE, L-DOPA, AND PARACHLOROPHENYLALANINE ON THE ZOOSOCIAL BEHAVIOR OF MICE

Moscow BYULLETEN' EKSPERIMENTAL'NOY BIOLOGII I MEDITSINY in Russian
No 4, 1979 pp 311-314 manuscript received 12 Jun 78

POSHIVALOV, V. P., Chair of Pharmacology, 1st Leningrad Medical Institute
imeni I. P. Pavlov

[Abstract] The effects of some psychotropic agents on the behavior of male mice kept in isolation for 6 weeks were evaluated in terms of their interaction with a partner maintained in a cohort. The behavior patterns of the experimental mice were reduced to essentially three modes after isolation: aggressiveness, sexual examination of the partner, and hyperactivity. Low doses of amphetamine (0.5 mg/kg) potentiated such behavior, while higher doses (1-5 mg/kg) led to the predominance of stereotyped hyperkinetic behavior; even greater doses (5-40 mg/kg) inhibited aggressiveness. L-DOPA at low doses (10 mg/kg) increased aggressiveness, while 200 mg/kg inhibited aggressive behavior and led to its replacement with avoidance responses. Parachlorophenylalanine in fractionated doses (300 + 100 + 100 mg/kg) potentiated social behavior within 1 h of administration, e.g., grooming, while within 24-72 h homosexual behavior set in with attenuation of aggressiveness. The results showed that psychotropic agents may potentiate the "pathologic isolation syndrome." Figures 3; references 14: 4 Russian, 10 Western.

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